APPLICATION FOR FINANCIAL ASSISTANCE
Revised 4/99

IMPORTANT: Please consult the "Instructions for Completing the Project Application" for assistance in completion of this form.

SUBDIVISION: City of Madeira **CODE#** 061 - 46312

DISTRICT NUMBER: 2 **COUNTY:** Hamilton **DATE** 11/26/08

CONTACT: Bruce G. Brandstetter **PHONE #** (513) 651-4224

(THE PROJECT CONTACT PERSON SHOULD BE THE INDIVIDUAL WHO WILL BE AVAILABLE ON A DAY-TO-DAY BASISDURING THE APPLICATION REVIEW AND SELECTION PROCESS AND WHO CAN BEST ANSWER OR COORDINATE THE RESPONSE TO QUESTIONS)

FAX (513) 651-0147 **E-MAIL** bbrandstetter@brandstettercarroll.com

PROJECT NAME: KENWOOD ROAD RECONSTRUCTION, Euclid Road to Kenwood Hills Drive

SUBDIVISION TYPE
(Check only 1)
- ____ 1. County
- _x_ 2. City
- ____ 3. Township
- ____ 4. Village
- ____ 5. Water/Sanitary District (Section 6119 or 6117O.R.C).

FUNDING TYPE REQUESTED
(Check All Requested & Enter Amount)
- _x_ 1. Grant $1,125,000
- ____ 2. Loan
- ____ 3. Loan Assistance

PROJECT TYPE
(Check Largest Component)
- _x_ 1. Road
- ____ 2. Bridge/Culvert
- ____ 3. Water Supply
- ____ 4. Wastewater
- ____ 5. Solid Waste
- ____ 6. Stormwater

TOTAL PROJECT COST: $ 2,250,000.00 **FUNDING REQUESTED:** $ 1,125,000.00

DISTRICT RECOMMENDATION
To be completed by the District Committee ONLY

GRANT:$ 1,125,000 **LOAN ASSISTANCE:**$_____
SCIP LOAN: $_____ **RATE:**_____% **TERM:** _____yrs.
RLP LOAN: $_____ **RATE:**_____% **TERM:** _____yrs.

(Check only 1)
- X State Capital Improvement Program
- ___Local Transportation Improvements Program
- ___Small Government Program

FOR OPWC USE ONLY

PROJECT NUMBER: C_____/C_____
Local Participation _____%
OPWC Participation _____%
Project Release Date: ___/___/___
OPWC Approval: _____

APPROVED FUNDING: $_____
Loan Interest Rate: _____%
Loan Term: _____years
Maturity Date: _____
Date Approved: ___/___/___
SCIP Loan _____ **RLP Loan**

1.0 PROJECT FINANCIAL INFORMATION

1.1 PROJECT ESTIMATED COSTS: (Round to Nearest Dollar)		TOTAL DOLLARS	FORCE ACCOUNT DOLLARS
a.) Basic Engineering Services:		$	
Preliminary Design	$		
Final Design	$		
Bidding	$		
Construction Phase	$		
Additional Engineering Services *Identify services and costs below.		$	
b.) Acquisition Expenses: Land and/or Right-of-Way		$	
c.) Construction Costs:		$ 2,050,000.00	
d.) Equipment Purchased Directly:		$	
e.) Permits, Advertising, Legal: (Or Interest Costs for Loan Assistance Applications Only)		$	
f.) Construction Contingencies:		$ 200,000.00	
g.) TOTAL ESTIMATED COSTS:		$ 2,250,000.00	

*List Additional Engineering Services here:

Service: Cost:

1.2 PROJECT FINANCIAL RESOURCES:

(Round to Nearest Dollar and Percent)

		DOLLARS	%
a.)	Local In-Kind Contributions	$	
b.)	Local Revenues	$ 1, 062,500.00	47
c.)	Other Public Revenues	$	
	ODOT	$	
	Rural Development	$	
	OEPA	$	
	OWDA	$	
	CDBG	$	
	OTHER MRF	$ 62,500.00	3
	SUBTOTAL LOCAL RESOURCES:	$ 1,125,000.00	50
d.)	OPWC Funds		
	1. Grant	$ 1,125,000.00	50
	2. Loan	$	
	3. Loan Assistance	$	
	SUBTOTAL OPWC RESOURCES:	$ 1,125,000.00	50
e.)	TOTAL FINANCIAL RESOURCES:	$ 2,250,000.00	100%

1.3 AVAILABILITY OF LOCAL FUNDS:

Attach a statement signed by the Chief Financial Officer listed in section 5.2 certifying all local share funds required for the project will be available on or before the earliest date listed in the Project Schedule section.

ODOT PID# _____ **Sale Date:** _____

STATUS: (Check one)

Traditional_____

Local Planning Agency (LPA)_____

State Infrastructure Bank_____

2.0 PROJECT INFORMATION

If project is multi-jurisdictional, information must be consolidated in this section.

2.1 PROJECT NAME: KENWOOD ROAD RECONSTRUCTION

2.2 BRIEF PROJECT DESCRIPTION - (Sections a through d):

A: SPECIFIC LOCATION:

This project is located on Kenwood Road, from Euclid Road to the south corporation limit, Kenwood Hills Drive. Complete roadway reconstruction is planned for the entire length of the project except the section from Whetsel Avenue to the south corporation limits.

PROJECT ZIP CODE: 45243

B: PROJECT COMPONENTS:

The complete reconstruction of Kenwood Road from Euclid Road to Whetsel Avenue. This includes removal of existing pavement and curbing and replacing it with new concrete curb and a full-depth asphalt pavement. The storm sewer system will be upgraded. The section from Whetsel Avenue to the south corporation line will receive drainage improvements and pavement rehabilitation.

A waterline replacement project, 8200 LF, is currently under construction. The alignment of the waterline is generally down the centerline of the road. This will result in trench cuts along the entire length of the project which will lead to future pavement failures.

C: PHYSICAL DIMENSIONS / CHARACTERISTICS:

The existing pavement is in critical condition. New water and sewer lines are planned for construction over the next 8 months. This project will complement the utility projects. Concrete curbs are deteriorating and there are many areas of pavement failures. The overall dimensions are 4300' x 37'.

Concrete Sidewalk	22,000 LF
Concrete curbs	8,500 LF
Full-Depth Pavement	17,300 SY
Storm Pipe Replacement	300 LF
Inlet Replacement	12 EA

D: DESIGN SERVICE CAPACITY:

Detail current service capacity versus proposed service level.

This is a reconstruction project and will not affect capacity.

Road or Bridge: Current ADT 11,291 Year: 2007 Projected ADT: 17,455 Year: 2029

Water/Wastewater: Based on monthly usage of 7,756 gallons per household, attach current rate ordinance. Current Residential Rate:$_____Proposed Rate: $ _____

Stormwater: Number of households served:_____

2.3 USEFUL LIFE/COST ESTIMATE: Project Useful Life: 20 Years.

Attach Registered Professional Engineer's statement, with original seal and signature confirming the project's useful life indicated above and estimated cost.

3.0 REPAIR/REPLACEMENT or NEW/EXPANSION:

TOTAL PORTION OF PROJECT REPAIR/REPLACEMENT	**$ 2,105,000**	**93.5 %**
TOTAL PORTION OF PROJECT NEW/EXPANSION (concrete sidewalk)	**$ 146,250**	**6.5 %**

4.0 PROJECT SCHEDULE: *

		BEGIN DATE	END DATE
4.1	**Engineering/Design:**	01 / 01 / 09	05 / 01 / 09
4.2	**Bid Advertisement and Award:**	05 / 01 / 09	07 / 01 / 09
4.3	**Construction:**	07 / 01 / 09	12 / 31 / 10
4.4	**Right-of-Way/Land Acquisition**	N/A	N/A

* Failure to meet project schedule may result in termination of agreement for approved projects. Modification of dates must be requested in writing by the CEO of record and approved by the commission once the Project Agreement has been executed. The project schedule should be planned around receiving a Project Agreement on or about July 1st.

5.0 APPLICANT INFORMATION:

5.1	CHIEF EXECUTIVE OFFICER	Thomas W. Moeller
	TITLE	City Manager
	STREET	7141 Miami Avenue
	CITY/ZIP	Madeira, Ohio 45243
	PHONE	513/561-7228
	FAX	513/272-4211
5.2	CHIEF FINANCIAL OFFICER	Steve Soper
	TITLE	Treasurer
	STREET	7141 Miami Avenue
	CITY/ZIP	Madeira, Ohio 45243
	PHONE	513/561-7228
	FAX	513/272-4211
5.3	PROJECT MANAGER	Bruce G. Brandstetter, P.E.
	TITLE	Brandstetter Carroll Inc.
	STREET	424 East Fourth Street
	CITY/ZIP	Cincinnati, Ohio 45202
	PHONE	513/651-4224
	FAX	513/651-0147

Changes in Project Officials must be submitted in writing from the CEO.

6.0 ATTACHMENTS/COMPLETENESS REVIEW:

Check each section below, confirming that each item listed is attached.

_x_ A certified copy of the legislation by the governing body of the applicant authorizing a designated official to sign and submit this application and execute contracts. This individual should sign under 7.0, Applicant Certification, below.

_x_ A certification signed by the applicant's chief financial officer stating all local share funds required for the project will be available on or before the dates listed in the Project Schedule section. If the application involves a request for loan (RLP or SCIP), a certification signed by the CFO which identifies a specific revenue source for repaying the loan also must be attached. Both certifications can be accomplished in the same letter.

_x_ A registered professional engineer's detailed cost estimate and useful life statement, as required in 164-1-13, 164-1-14 and 164-1-16 of the Ohio Administrative Code. Estimates shall contain engineer's original seal or stamp and signature.

N/A A cooperation agreement (if the project involves more than one subdivision or district) which identifies the fiscal and administrative responsibilities of each participant.

N/A Projects which include new and expansion components and potentially affect productive farmland should include a statement evaluating the potential impact. If there is a potential impact, the Governor's Executive Order 98-VII and the OPWC Farmland Preservation Review Advisory apply.

_x_ Capital Improvements Report: (Required by 164 O.R.C. on standard form)

_x_ Supporting Documentation: Materials such as additional project description, photographs, economic impact (temporary and/or full time jobs likely to be created as a result of the project), accident reports, impact on school zones, and other information to assist your district committee in ranking your project. Be sure to include supplements which may be required by your *local* District Public Works Integrating Committee.

7.0 APPLICANT CERTIFICATION:

The undersigned certifies that: (1) he/she is legally authorized to request and accept financial assistance from the Ohio Public Works Commission; (2) that to the best of his/her knowledge and belief, all representations that are part of this application are true and correct; (3) that all official documents and commitments of the applicant that are part of this application have been duly authorized by the governing body of the applicant; and, (4) should the requested financial assistance be provided, that in the execution of this project, the applicant will comply with all assurances required by Ohio Law, including those involving Buy Ohio, and prevailing wages.

IMPORTANT: **Applicant certifies that physical construction on the project as defined in the application has NOT begun, and will not begin until a Project Agreement on this project has been executed with the Ohio Public Works Commission. Action to the contrary will result in termination of the agreement and withdrawal of Ohio Public Works Commission funding of the project.**

Thomas W. Moeller, City Manager
Certifying Representative (Type or Print Name and Title)

Thomas W. Moeller 9-17-08
Signature/Date Signed

CITY OF MADEIRA

Thomas W. Moeller
City Manager

7141 Miami Avenue • Cincinnati, Ohio 45243-2699
(513) 561-7228 • Fax (513) 272-4211

December 1, 2008

District Two Integrating Committee
Hamilton County Engineer's Office
138 East Court Street
Cincinnati, OH 45202

Attention: Joe Cottrill

RE: City of Madeira
SCIP Application/FY09 (Revised)
Kenwood Road Improvement Project

Ladies/Gentlemen:

It is hereby certified that the local matching funds in the amount of $1,062,500 for the above referenced project will be appropriated in the FY09 Budget. It is understood we will receive an amount of $62,500 in Municipal Road Funds for this project. We also understand this project will be funded in 2009 and the City will be prepared to meet the scheduling deadlines stated within the approved application. We will be expected to submit another application for the 2010 funding round to complete the project.

Thank you for your time and consideration. Please call me if you have any questions.

Sincerely,

Thomas W. Moeller

Thomas W. Moeller
City Manager

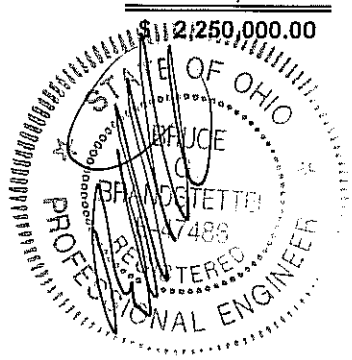
c: Bruce Brandstetter, City Engineer

SCIP FY09 Kenwood Road Project 08dec01

PRELIMINARY OPINION OF PROBABLE COST
KENWOOD ROAD
MADEIRA, OHIO
Revised November 25, 2008
08006

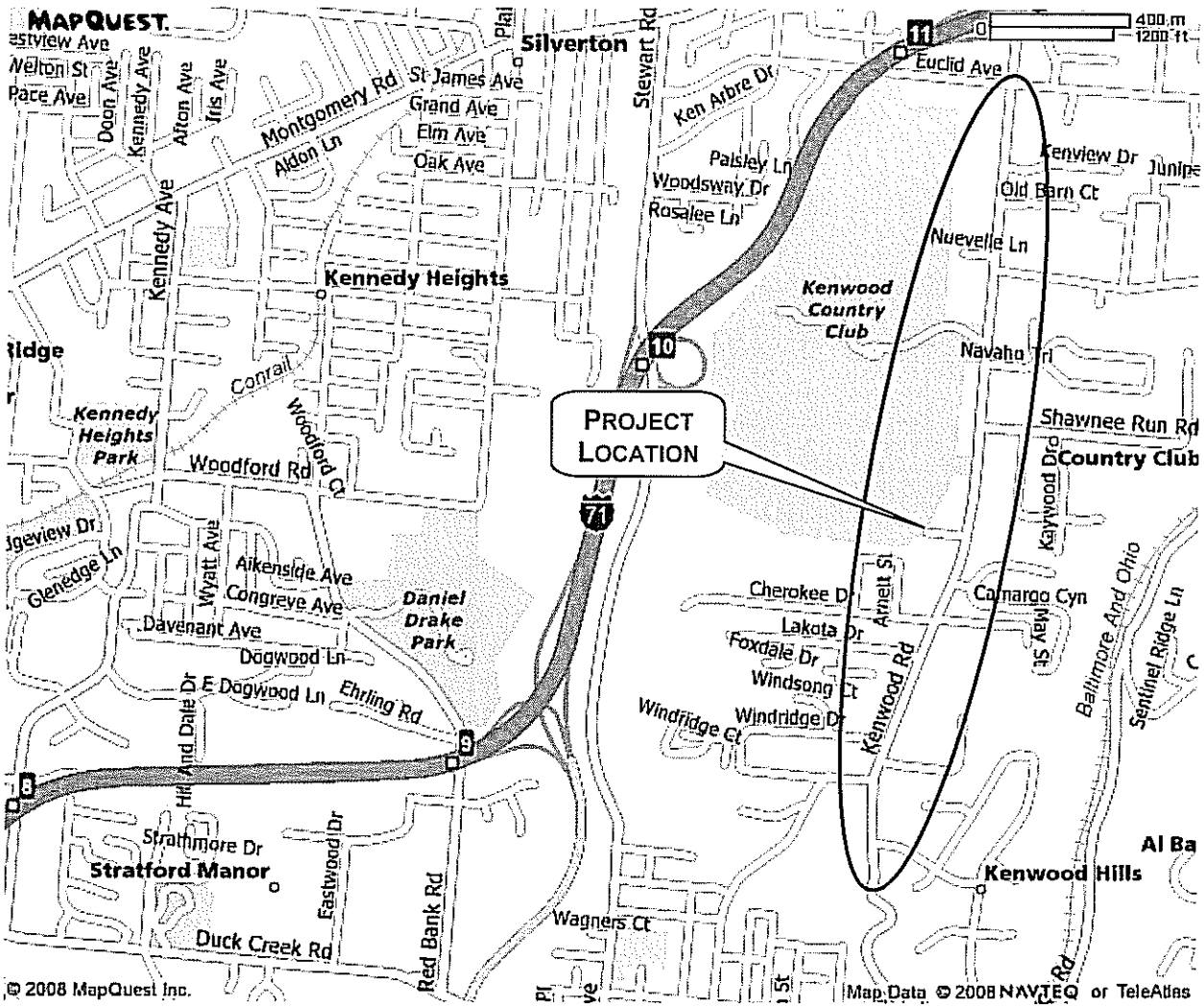
DESCRIPTION	QUANTITY	UNIT		UNIT COST	TOTAL
Pavement Removal					
Roadway	17,150	SY	@	$ 10.00	$ 171,500.00
Driveway	200	SY	@	10.00	2,000.00
Excavation	2,700	CY	@	30.00	81,000.00
New Full Depth Pavement-Euclid to Whetsel					
8" Bituminous Aggregate Base	4,000	CY	@	130.00	520,000.00
2-1/2" Asphalt Concrete, Leveling	1,250	CY	@	145.00	181,250.00
1-1/2" Asphalt Concrete, Surface	750	CY	@	150.00	112,500.00
Concrete Curb	8,500	LF	@	25.00	212,500.00
Driveways	1,800	SY	@	40.00	72,000.00
6" Gravel Base (Drainage Layer)	3,150	CY	@	40.00	126,000.00
Geotextile Fabric	17,150	SY	@	2.50	42,875.00
Asphalt Leveling and Surface Course (Whetsel to Kenwood Hills Dr.)	100	CY	@	150.00	15,000.00
Concrete Sidewalk	22,000	SF	@	5.00	110,000.00
Modular Wall at Sidewalk	1,100	SF	@	22.00	24,200.00
Manhole Adjustments	1	LS	@	3,675.00	3,675.00
Underdrains	8,500	LF	@	15.00	127,500.00
Storm Inlet Reconstruction / Replacement	12	EA	@	1,500.00	18,000.00
Storm Pipe Replacement	300	LF	@	100.00	30,000.00
Subgrade Excavation/Replacement	2,150	CY	@	50.00	107,500.00
Downspout Pipe	100	LF	@	15.00	1,500.00
Pavement Markings	1	LS	@	25,000.00	25,000.00
Seed and Mulch	2,000	SY	@	2.00	4,000.00
Topsoil	250	CY	@	40.00	10,000.00
Mobilization	1	LS	@	12,500.00	12,500.00
Construction Staking	1	LS	@	14,500.00	14,500.00
Maintenance of Traffic	1	LS	@	25,000.00	25,000.00
Sub-Total					**$ 2,050,000.00**
Contingency					$ 200,000.00
Total					**$ 2,250,000.00**

This is to certify that this project, upon satisfactory completion and normal environmental and climatic conditions will have a useful life of 20 years.



X:\OPWC\PY09\Madeira\Kenwood Euclid-SCorpLine PCE Rev 081125 bgb.xls(08Funding)djb

PROJECT LOCATION



PY 2009 SCIP APPLICATION
September 19, 2008

KENWOOD ROAD
Euclid Road to Kenwood Hills Drive
MADEIRA, OHIO

ORDINANCE NO. 08-38

AUTHORIZING THE CITY MANAGER TO SUBMIT AN APPLICATION FOR STATE CAPITAL IMPROVEMENT PROGRAM (SCIP) FUNDS FOR THE KENWOOD ROAD RESURFACING IMPROVEMENTS PROJECT

WHEREAS, it is determined that Kenwood Road is in need of resurfacing improvements; and

WHEREAS, the State Capital Improvement Program will fund work on the aforementioned street; and

WHEREAS, the City Manager recommends that we submit an application for this project.

NOW, THEREFORE, BE IT ORDAINED by the Council of the City of Madeira, State of Ohio:

Section 1. That the City Manager is hereby authorized to submit an application to the State Capital Improvement Program District Integrating Committee for funding under the State Capital Improvement Program for the Kenwood Road Resurfacing Improvements Project.

Section 2. That this Ordinance shall take effect from and after the earliest period allowed by law.

PASSED ON THE 8TH DAY OF SEPTEMBER, 2008
BY THE FOLLOWING 5-0 VOTE:

YEA:	**NAY:**	**ABSTAIN:**	**ABSENT:**
Ken Born			Rick Brasington
Tim Dicke			John Dobbs
Sarah Evans			
Dave Sams			
Rick Staubach			

Sarah A. Evans, Mayor

Diane D. Novakov, Clerk of Council

CERTIFICATE OF COPY

STATE OF OHIO

City of Madeira **SS**
County Hamilton

I, Diane Novakov **,Clerk of the City of** Madeira **,Ohio do hereby certify that the foregoing is a true and correct copy of Ordinance No. 08-38 adopted by the legislative Authority of the said City on the** 8th **day of** September **,** 2008 **,that the publications of such ordinance be made and certified of record according to law; that no proceedings looking to a referendum upon such ordinance have been taken; and that such ordinance and certificate of publication thereof are of record in Ordinance No. 08-38,Page** 38

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my official seal, this 9th **day of** September **,** 2008 **.**
(SEAL)

Diane D. Novakov, Clerk of Council

City of Madeira **, Ohio**

HAMILTON COUNTY ENGINEER'S OFFICE

PROJECT APPLICATION - MUNICIPAL ROAD FUND - 2009

INSTRUCTIONS: Use one form for each project. Assign priority to projects. The Municipality's Engineer, or a registered Engineer of the Municipality's choosing shall prepare the application cost estimate. Submit by 4:00 p.m., Friday, August 29, 2008.

1. Municipality: City of Madeira, Ohio
2. Road Name: Kenwood Road
3. Project Limits: Euclid to South Corporation Line (Kenwood Hills Drive)
   (Please give a "from – to" limit if possible.)
4. Project Priority: One
5. Present Roadway Data: (Answer all that apply)
   a. Pav't Width: 37 b. R/W Width: 60' c. Curb Type: Integral with Pavement
   d. Type Surface: Asphalt e. Type Base: Concrete f. Shldr Type: N/A
   g. Shldr Width: N/A h. Year Last Resurfaced: 1993
6. Present condition of project area: List deficiencies & reasons for improvement.

   Existing pavement is in poor condition. Roadway was overlaid (with base repairs) in 1993. It deteriorated quickly (within six to seven years). The failures are primarily along the longitudinal joints where it was widened by 8 feet, 6 inches on each side in 1949 with eight inches of reinforced concrete. A waterline replacement project currently under construction and two sanitary sewer projects will add to the already inadequate pavement surface.

7. Project description or statement of work to be done: Include width and type of new pavement and other project particulars. List also any type of "Green" technology/materials/construction methods that will be used in this project.

   New pavement shall be the same width. Total reconstruction is proposed with six-inch granular base and ten inches of concrete. Storm structures and storm pipe shall be replaced and under drains provided.

   Warm asphalt shall be used for the surface course.

8. Traffic Data: a. Present Volume: 11,300 b. Date of Count: 8/07
9. Cost Estimate:

   When engineering plans are necessary, list the following costs:

a.	Preparation of preliminary plans and estimate, etc.	$ 110,000
b.	Preparation of final plans & estimate, etc.	$ 160,000
c.	Construction Cost Estimate	$ 4,500,000
d.	Other Costs (Specify) Construction Administration	$ 135,000
	TOTAL AMOUNT OF MRF FUNDS APPLIED FOR	$ 125,000

10. Estimated date construction can be started after approval: July, 2009
11. Estimated date construction can be started if not funded 100% from MRF: Unknown, local funds not available
12. Are the MRF funds to be used as matching funds for SCIP/LTIP? X Yes ___ No

    If yes, what percentage of the project cost? 3 %
13. Cost Estimate Prepared by: Bruce Brandstetter Date: August 29, 2008
14. Application Prepared by: [signature] Date: 8/29/08

Make copies of this form as needed.
2009 MRF Form

X:\MRF\Madeira\Kenwood 08Appl bgb(08Funding) djb

SUMMARY SHEET
KENWOOD ROAD TRAFFIC COUNTS
MADEIRA, OHIO
September 12, 2008
08006

BRANDSTETTER CARROLL INC.
Architects Engineers Planners

Kenwood Road, near Euclid

Southbound	5,542	24-hour count
Northbound	5,749	24-hour count
	11,291	Bi-Directional ADT

The following data was collected on August 29 and 30, 2007.
This information is certified to be accurate.

Note: Updated counts were not taken in 2008 due to the various, adjacent projects (Whetsel Avenue Sanitary Sewer, Shawnee Run Road Reconstruction, Kenwood Road Waterline and Kenwood Road (City of Cincinnati) Water and Sewer Extensions. Traffic counts taken in 2008 would not be accurate as a result of these projects.

BEB:djb

Kenwood Road near Euclid
Start Date: 8/29/2007
Start Time: 12:30:00 PM

	NB Kenwood Road	SB Kenwood Road	Total Volume
8/29/2007 12:30 PM	72	90	162
8/29/2007 12:45 PM	120	70	190
8/29/2007 01:00 PM	69	69	138
8/29/2007 01:15 PM	100	86	186
8/29/2007 01:30 PM	90	87	177
8/29/2007 01:45 PM	100	108	208
8/29/2007 02:00 PM	94	86	180
8/29/2007 02:15 PM	98	104	202
8/29/2007 02:30 PM	100	121	221
8/29/2007 02:45 PM	109	115	224
8/29/2007 03:00 PM	108	131	239
8/29/2007 03:15 PM	86	132	218
8/29/2007 03:30 PM	84	120	204
8/29/2007 03:45 PM	102	136	238
8/29/2007 04:00 PM	81	127	208
8/29/2007 04:15 PM	105	141	246
8/29/2007 04:30 PM	112	142	254
8/29/2007 04:45 PM	130	122	252
8/29/2007 05:00 PM	112	132	244
8/29/2007 05:15 PM	120	130	250
8/29/2007 05:30 PM	76	122	198
8/29/2007 05:45 PM	81	74	155
8/29/2007 06:00 PM	69	87	156
8/29/2007 06:15 PM	82	79	161
8/29/2007 06:30 PM	66	82	148
8/29/2007 06:45 PM	60	70	130
8/29/2007 07:00 PM	56	83	139
8/29/2007 07:15 PM	45	55	100
8/29/2007 07:30 PM	50	58	108
8/29/2007 07:45 PM	52	69	121
8/29/2007 08:00 PM	37	73	110
8/29/2007 08:15 PM	32	60	92
8/29/2007 08:30 PM	41	55	96
8/29/2007 08:45 PM	30	28	58
8/29/2007 09:00 PM	27	38	65
8/29/2007 09:15 PM	18	42	60
8/29/2007 09:30 PM	16	20	36
8/29/2007 09:45 PM	13	19	32
8/29/2007 10:00 PM	12	20	32
8/29/2007 10:15 PM	14	11	25
8/29/2007 10:30 PM	4	14	18
8/29/2007 10:45 PM	6	7	13
8/29/2007 11:00 PM	6	13	19
8/29/2007 11:15 PM	10	6	16
8/29/2007 11:30 PM	6	6	12
8/29/2007 11:45 PM	1	8	9
8/30/2007 12:00 AM	0	3	3
8/30/2007 12:15 AM	3	5	8
8/30/2007 12:30 AM	3	5	8

Kenwood Road near Euclid
Start Date: 8/29/2007
Start Time: 12:30:00 PM

8/30/2007 12:45 AM	1	5	6
8/30/2007 01:00 AM	1	4	5
8/30/2007 01:15 AM	1	0	1
8/30/2007 01:30 AM	1	2	3
8/30/2007 01:45 AM	3	3	6
8/30/2007 02:00 AM	1	4	5
8/30/2007 02:15 AM	3	0	3
8/30/2007 02:30 AM	0	1	1
8/30/2007 02:45 AM	2	1	3
8/30/2007 03:00 AM	2	2	4
8/30/2007 03:15 AM	4	1	5
8/30/2007 03:30 AM	7	1	8
8/30/2007 03:45 AM	4	2	6
8/30/2007 04:00 AM	5	3	8
8/30/2007 04:15 AM	8	2	10
8/30/2007 04:30 AM	12	7	19
8/30/2007 04:45 AM	22	15	37
8/30/2007 05:00 AM	20	7	27
8/30/2007 05:15 AM	45	21	66
8/30/2007 05:30 AM	58	26	84
8/30/2007 05:45 AM	82	43	125
8/30/2007 06:00 AM	94	52	146
8/30/2007 06:15 AM	124	47	171
8/30/2007 06:30 AM	135	59	194
8/30/2007 06:45 AM	138	84	222
8/30/2007 07:00 AM	126	69	195
8/30/2007 07:15 AM	132	67	199
8/30/2007 07:30 AM	124	75	199
8/30/2007 07:45 AM	130	68	198
8/30/2007 08:00 AM	90	68	158
8/30/2007 08:15 AM	72	47	119
8/30/2007 08:30 AM	82	58	140
8/30/2007 08:45 AM	87	64	151
8/30/2007 09:00 AM	76	68	144
8/30/2007 09:15 AM	78	70	148
8/30/2007 09:30 AM	61	63	124
8/30/2007 09:45 AM	85	77	162
8/30/2007 10:00 AM	92	72	164
8/30/2007 10:15 AM	108	91	199
8/30/2007 10:30 AM	88	70	158
8/30/2007 10:45 AM	95	79	174
8/30/2007 11:00 AM	76	116	192
8/30/2007 11:15 AM	92	104	196
8/30/2007 11:30 AM	78	68	146
8/30/2007 11:45 AM	96	74	170
8/30/2007 12:00 PM	81	96	177
8/30/2007 12:15 PM	80	88	168
8/30/2007 12:30 PM	39	37	76
24 Hour Total	5749	5542	11291

Kenwood Road Reconstruction
From Euclid Road to Kenwood Hills Drive

Madeira, Ohio
September 19, 2008

ADDITIONAL SUPPORT INFORMATION

For Program Year 2009 (July 1, 2009 through June 30, 2010), applying agencies shall provide the following support information to help determine which projects will be funded. Information on this form must be accurate, and where called for, based on sound engineering principles. Documentation to substantiate the individual items, as noted, is required. The applicant should also use the rating system and its' addendum as a guide. The examples listed in this addendum are not a complete list, but only a small sampling of situations that may be relevant to a given project.

IF YOU ARE APPLYING FOR A GRANT, WILL YOU BE WILLING TO ACCEPT A LOAN IF ASKED BY THE DISTRICT? _____YES ___X___NO (ANSWER REQUIRED)

Note: Answering "Yes" will not increase your score and answering "NO" will not decrease your score.

1) What is the physical condition of the existing infrastructure that is to be replaced or repaired?

Give a statement of the nature of the deficient conditions of the present facility exclusive of capacity, serviceability, health and/or safety issues. If known, give the approximate age of the infrastructure to be replaced, repaired, or expanded. Use documentation (if possible) to support your statement. Documentation may include (but is not limited to): ODOT BR86 reports, pavement management condition reports, televised underground system reports, age inventory reports, maintenance records, etc., and will only be considered if included in the original application.

The existing pavement is in critical condition, it was constructed in 1949. Utility cuts, along with the overall deterioration of the pavement and concrete curbs, have resulted in a pavement that is in critical condition. The existing pavement was widened in 1949 and is 8" thick concrete with a 2" asphalt overlay. Per the enclosed Geotechnical Report by the H.C. Nutting Company dated September 2007, the subgrade has deteriorated and is the major cause of failure. The subgrade can only be corrected by full-depth reconstruction. Please see pages 11,12, 13 and 14. Now with the waterline replacement project (8200 LF), the condition of the pavement will deteriorate more quickly.

2) How important is the project to the safety of the Public and the citizens of the District and/or service area?

Give a statement of the projects effect on the safety of the service area. The design of the project is intended to reduce existing accident rate, promote safer conditions, and reduce the danger of risk, liability or injury. (Typical examples may include the effects of the completed project on accident rates, emergency response time, fire protection, and highway capacity.) Please be specific and provide documentation if necessary to substantiate the data. The applicant must demonstrate the type of problems that exist, the frequency and severity of the problems and the method of correction.

This roadway is a primary north-south connector between Madeira, Columbia and Sycamore Townships. The proposed construction will include storm pipe and inlet replacement. Due to the pavement failures, the roadway is becoming unsafe to the traveling public. The current water and sewer projects will add to the pavement deterioration.

3) How important is the project to the health of the Public and the citizens of the District and/or service area?

Give a statement of the projects effect on the health of the service area. The design of the project will improve the overall condition of the facility so as to reduce or eliminate potential for disease, or correct concerns regarding the environmental health of the area. (Typical examples may include the effects of the completed project by improving or adding storm drainage or sanitary facilities, etc.). Please be specific and provide documentation if necessary to substantiate the data. The applying agency must demonstrate the type of problems that exist, the frequency and severity of the problems and the method of correction.

N/A

4) **Does the project help meet the infrastructure repair and replacement needs of the applying jurisdiction?**

The applying agency must submit a listing in priority order of the projects for which it is applying. Points will be awarded on the basis of most to least importance.

Priority 1 Kenwood Road Reconstruction

Priority 2 _____

Priority 3 _____

Priority 4 _____

Priority 5 _____

5) To what extent will the user fee funded agency be participating in the funding of the project?

(example: rates for water or sewer, frontage assessments, etc.).

_____

_____

6) **Economic Growth – How will the completed project enhance economic growth**

Give a statement of the projects effect on economic growth (be specific).

It is important to keep the pavement and drainage in good condition. The City needs to maintain the right-of-way in good condition so as to preserve property values and encourage the redevelopment that is taking place all along Kenwood Road, from the highrise construction in the City of Cincinnati thru the residential area of Madeira to the commercial redevelopment in Sycamore Township.

7) **Matching Funds - LOCAL**

The information regarding local matching funds is to be filed by the applicant in Section 1.2 (b) of the Ohio Public Works Association's "Application For Financial Assistance" form.

8) **Matching Funds - OTHER**

The information regarding local matching funds is to be filed by the applying agency in Section 1.2 (c) of the Ohio Public Works Association's "Application For Financial Assistance" form. If MRF funds are being used for matching funds, the MRF application must have been filed by **Friday, August 29, 2008** for this project with the Hamilton County Engineer's Office. List below all "other" funding the source(s).

MRF funds have been applied for $ 125,000.00

_____

_____

_____

9) **Will the project alleviate serious capacity problems or hazards or respond to the future level of service needs of the district?**

Describe how the proposed project will alleviate serious capacity problems (be specific).

Project will eliminate pavement failures, repair/replace deteriorating manholes and storm inlets, and eliminate ponding of water. These improvements will maintain good, uninterrupted vehicular, bicycle, and pedestrian traffic.

Level of Service (LOS) calculations shall be for the improvements being made in the application. If this project is a phase of a larger project then any preceding phases shall be considered existing conditions for LOS calculations. Any future project phases shall not be considered as part of this applications LOS calculations.

For roadway betterment projects, provide the existing and proposed Level of Service (LOS) of the facility using the methodology outlined within AASHTO'S "Geometric Design of Highways and Streets" and the current edition of the Highway Capacity Manual.

No Build	Proposed Geometry
Current Year LOS ____	Current Year LOS ____
Design Year LOS ____	Design Year LOS ____

If the proposed design year LOS is not "C" or better, explain why LOS "C" cannot be achieved.

N/A; This is a replacement project, not a betterment.

10) If SCIP/LTIP funds are granted, when would the construction contract be awarded?

If SCIP/LTIP funds are awarded, how soon after receiving the Project Agreement from OPWC (tentatively set for July 1 of the year following the deadline for applications) would the project be under contract? The Support Staff will review status reports of previous projects to help judge the accuracy of a jurisdiction's anticipated project schedule.

Number of months 1 Month

a.) Are preliminary plans or engineering completed? Yes x No ____ N/A ____

b.) Are detailed construction plans completed? Yes ____ No x N/A ____

c.) Are all utility coordination's completed? Yes ____ No x N/A ____

d.) Are all right-of-way and easements acquired (if applicable)? Yes ____ No ____ N/A x

If no, how many parcels needed for project? ____ Of these, how many are: Takes ____

Temporary ____

Permanent ____

For any parcels not yet acquired, explain the status of the ROW acquisition process for this project.

_____

_____

e.) Give an estimate of time needed to complete any item above not yet completed. 4 months.

11) Does the infrastructure have regional impact?

Give a brief statement concerning the regional significance of the infrastructure to be replaced, repaired, or expanded.

The overall project has regional impact in so far as it serves not only the City of Madeira, but also the City of Cincinnati, Columbia Township and Sycamore Township. It also is a major north-south connector for I-71.

12) What is the overall economic health of the jurisdiction?

The District 2 Integrating Committee predetermines the jurisdiction's economic health. The economic health of a jurisdiction may periodically be adjusted when census and other budgetary data are updated.

13) Has any formal action by a federal, state, or local government agency resulted in a partial or complete ban of the usage or expansion of the usage for the involved infrastructure?

Describe what formal action has been taken which resulted in a ban of the use of or expansion of use for the involved infrastructure? Typical examples include weight limits, truck restrictions, and moratoriums or limitations on issuance of building permits, etc. The ban must have been caused by a structural or operational problem to be considered valid. Submission of a copy of the approved legislation would be helpful.

No Ban

Will the ban be removed after the project is completed? Yes _____ No _____ N/A X

14) What is the total number of existing daily users that will benefit as a result of the proposed project?

For roads and bridges, multiply current Average Daily Traffic (ADT) by 1.20. For inclusion of public transit, submit documentation substantiating the count. Where the facility currently has any restrictions or is partially closed, use documented traffic counts prior to the restriction. For storm sewers, sanitary sewers, water lines, and other related facilities, multiply the number of households in the service area by 4. User information must be documented and certified by a professional engineer or the jurisdictions' C.E.O.

Traffic: ADT 11,291 X 1.20 = 13,549 Users

Water/Sewer: Homes _____ X 4.00 = _____ Users

15) Has the jurisdiction enacted the optional $5 license plate fee, an infrastructure levy, a user fee, or dedicated tax for the pertinent infrastructure?

The applying jurisdiction shall list what type of fees, levies or taxes they have dedicated toward the type of infrastructure being applied for.

Optional $5.00 License Tax X

Infrastructure Levy _____ Specify type _____

Facility Users Fee _____ Specify type _____

Dedicated Tax _____ Specify type _____

Other Fee, Levy or Tax _____ Specify type _____

SCIP/LTIP PROGRAM
ROUND 23 - PROGRAM YEAR 2009
PROJECT SELECTION CRITERIA
JULY 1, 2009 TO JUNE 30, 2010

NAME OF APPLICANT: MADERA

NAME OF PROJECT: KENWOOD RD RECONST

RATING TEAM: 5

General Statement for Rating Criteria

Points awarded for all items will be based on engineering experience, field verification, application information and other information supplied by the applying agency, which is deemed to be relevant by the Support Staff. The examples listed in this addendum are not a complete list, but only a small sampling of situations that may be relevant to a given project.

CIRCLE THE APPROPRIATE RATING

1) **What is the physical condition of the existing infrastructure that is to be replaced or repaired?**

25 - Failed
23 - Critical
(20) - Very Poor
17 - Poor
15 - Moderately Poor
10 - Moderately Fair
5 - Fair Condition
0 - Good or Better

Appeal Score _____

Criterion 1 - Condition

Condition of the particular infrastructure to be repaired, reconstructed or replaced shall be a measure of the degree of reduction in condition from its original state. Historic pavement management data based on ASTM D6433-99 rating system may be submitted as documentation. Capacity, serviceability, safety and health shall not be considered in this criterion. Any documentation the Applicant wishes to be considered must be included in the application package.

Definitions:

Failed Condition - requires complete reconstruction where no part of the existing facility is salvageable. (E.g. Roads: complete reconstruction of roadway, curbs and base; Bridges: complete removal and replacement of bridge; Underground: removal and replacement of an underground drainage or water system.

Critical Condition - requires partial reconstruction to maintain integrity. (E.g. Roads: reconstruction of roadway/curbs can be saved; Bridges: removal and replacement of bridge with abutment modification; Underground: removal and replacement of part of an underground drainage or water system.

Very Poor Condition - requires extensive rehabilitation to maintain integrity. (E.g. Roads: extensive full depth, partial depth and curb repair of a roadway with a structural overlay; Bridges: superstructure replacement; Underground: repair of joints and/or replacement of pipe sections.

Poor Condition - requires standard rehabilitation to maintain integrity. (E.g. Roads: moderate full depth, partial depth and curb repair to a roadway with no structural overlay needed or structural overlay with minor repairs to a roadway needed; Bridges: extensive patching of substructure and replacement of deck; Underground: insituform or other in ground repairs.

Moderately Poor Condition - requires minor rehabilitation to maintain integrity. (E.g. Roads: minor full depth, partial depth or curb repairs to a roadway with either a thin overlay or no overlay needed; Bridges: major structural patching and/or major deck repair.

Moderately Fair Condition - requires extensive maintenance to maintain integrity. (E.g. Roads: thin or no overlay with extensive crack sealing, minor partial depth and/or slurry or rejuvenation; Bridges: minor structural patching, deck repair, erosion control.)

Fair Condition - requires routine maintenance to maintain integrity. (E.g. Roads: slurry seal, rejuvenation or routine crack sealing to the roadway; Bridges: minor structural patching.)

Good or Better Condition - little to no maintenance required to maintain integrity.

Note: **If the infrastructure is in "good" or better condition, it will NOT be considered for SCIP/LTIP funding unless it is an expansion project that will improve serviceability.**

2) **How important is the project to the safety of the Public and the citizens of the District and/or service area?**

25 - Highly significant importance
20 - Considerably significant importance
15 - Moderate importance
10 - Minimal importance
5 – Poorly documented importance
(0) - No measurable impact

Appeal Score _____

Criterion 2 – Safety
The applying agency shall include in its application the type of deficiency that currently exists and how the intended project would improve the situation. For example, have there been vehicular accidents attributable to the problems cited? Have they involved injuries or fatalities? In the case of water systems, are existing hydrants non-functional? In the case of water lines, is the present capacity inadequate to provide volumes or pressure for adequate fire protection? **In all cases, specific documentation is required.** Mentioned problems, which are poorly documented, generally will not receive more than 5 points.

Note: Each project is looked at on an individual basis to determine if any aspects of this category apply. **Examples given above are NOT intended to be exclusive.**

3) **How important is the project to the health of the Public and the citizens of the District and/or service area?**

25 - Highly significant importance
20 - Considerably significant importance
15 - Moderate importance
10 - Minimal importance
5 - Poorly documented importance
(0) - No measurable impact

Appeal Score _____

Criterion 3 – Health
The applying agency shall include in its application the type, frequency, and severity of the health problem that would be eliminated or reduced by the intended project. For example, can the problem be eliminated only by the project, or would routine maintenance be satisfactory? If basement flooding has occurred, was it storm water or sanitary flow? What complaints if any are recorded? In the case of underground improvements, how will they improve health if they are storm sewers? How would improved sanitary sewers improve health or reduce health risk? **In all cases, quantified documentation is required.** Mentioned problems, which are poorly documented, generally will not receive more than 5 points.

Note: Each project is looked at on an individual basis to determine if any aspects of this category apply. **Examples given above are NOT intended to be exclusive.**

4) **Does the project help meet the infrastructure repair and replacement needs of the applying agency?**
Note: Applying agency's priority listing (part of the Additional Support Information) must be filed with application(s).

(25) First priority project
20 - Second priority project
15 -Third priority project
10 - Fourth priority project
5 - Fifth priority project or lower

Appeal Score _____

Criterion 4 – Jurisdiction's Priority Listing
The applying agency **must** submit a listing in priority order of the projects for which it is applying. Points will be awarded on the basis of most to least importance. The form is included in the Additional Support Information.

5) **To what extent will a user fee funded agency be participating in the funding of the project?**

10 – Less than 10%
9 – 10% to 19.99%
8 – 20% to 29.99%
7 – 30% to 39.99%
6 – 40% to 49.99%
5 – 50% to 59.99%
4 – 60% to 69.99%
3 – 70% to 79.99%
2 – 80% to 89.99%
1 – 90% to 95%
0 – Above 95%

Appeal Score _____

Criterion 5 – User Fee-funded Agency Participation
To what extent will a user fee funded agency be participating in the funding of the project? (Example: rates for water or sewer, frontage assessments, etc.). The applying agency must submit documentation.

6) **Economic Growth – How the completed project will enhance economic growth (See definitions).**

10 – The project will directly secure new employment
5 – The project will permit more development
0 – The project will not impact development

Appeal Score _____

Criterion 6 – Economic Growth
Will the completed project enhance economic growth and/or development in the service area?

Definitions:

Secure new employment: The project as designed will secure development/employers, which will immediately add new permanent employees to the jurisdiction. The applying agency must submit details.

Permit more development: The project as designed will permit additional business development/employment. The applying agency must supply details.

The project will not impact development: The project will have no impact on business development.

Note: **Each project is looked at on an individual basis to determine if any aspects of this category apply.**

7) **Matching Funds - LOCAL**

10 - This project is a loan or credit enhancement
10 – 50% or higher
8 – 40% to 49.99%
6 – 30% to 39.99%
4 – 20% to 29.99%
2 – 10% to 19.99%
0 – Less than 10%

List total percentage of "Local" funds 47 **%**

Criterion 7 – Matching Funds – Local

The percentage of matching funds which come directly from the budget of the applying agency. Ten points shall be awarded if a loan request is at least 50% of the total project cost. (If the applying agency is not a user fee funded agency, any funds to be provided by a user fee generating agency will be considered "Matching Funds – Other").

8) **Matching Funds – OTHER** **List total percentage of "Other" funds** 3 **%**

10 – 50% or higher
8 – 40% to 49.99%
6 – 30% to 39.99%
4 – 20% to 29.99%
2 – 10% to 19.99%
(1) – 1% to 9.99%
0 – Less than 1%

List below each funding source and percentage

MRF	3 %
	%
	%
	%
	%

Criterion 8 – Matching Funds - Other
The percentage of matching funds that come from funding sources other than those mentioned in Criterion 7. A letter from the outside funding agency stating their financial participation in the project and the amount of funding is required to receive points. For MRF, a copy of the current application form filed with the Hamilton County Engineer's Office meets the requirement.

9) **Will the project alleviate serious capacity problems or hazards or respond to the future level of service needs of the district?**

10 - Project design is for future demand.
8 - Project design is for partial future demand.
6 - Project design is for current demand.
4 - Project design is for minimal increase in capacity.
(0) - Project design is for no increase in capacity.

Appeal Score

_____

Criterion 9 – Alleviate Capacity Problems
The applying agency shall provide a narrative, along with pertinent support documentation, which describe the existing deficiencies and showing how congestion will be reduced or eliminated and how service will be improved to meet the needs of any expected growth or development. A formal capacity analysis must accompany the application to receive more than 4 points. Projected traffic or demand should be calculated as follows:

Formula:
Existing volume x design year factor = projected volume

Design Year	Design year factor		
	Urban	Suburban	Rural
20	1.40	1.70	1.60
10	1.20	1.35	1.30

Definitions:
Future demand – Project will eliminate existing congestion or deficiencies and will provide sufficient capacity or service for twenty-year projected demand or fully developed area conditions. Justification must be supplied if the area is already largely developed or undevelopable and thus the projection factors used deviate from the above table.
Partial future demand – Project will eliminate existing congestion or deficiencies and will provide sufficient capacity or service for ten-year projected demand or partially developed area conditions. Justification must be supplied if the area is already largely developed or undevelopable and thus the projection factors used deviate from the above table.
Current demand – Project will eliminate existing congestion or deficiencies and will provide sufficient capacity or service only for existing demand and conditions.
Minimal increase – Project will reduce but not eliminate existing congestion or deficiencies and will provide a minimal but less than sufficient increase in existing capacity or service for existing demand and conditions.
No increase – Project will have no effect on existing congestion or deficiencies and provide no increase in capacity or service for existing demand and conditions.

10) Readiness to Proceed - If SCIP/LTIP funds are granted, when would the construction contract be awarded?

5 - Will be under contract by December 31, 2009 and no delinquent projects in Rounds 20 & 21
3 - Will be under contract by March 31, 2010 and/or one delinquent project in Rounds 20 & 21
0 - Will not be under contract by March 31, 2010 and/or more than one delinquent project in Rounds 20 & 21

Criterion 10 – Readiness to Proceed
The Support Staff will assign points based on engineering experience and status of design plans. A project is considered delinquent when it has not received a notice to proceed within the time stated on the original application and no time extension has been granted by the OPWC. An applying agency receiving approval for a project and subsequently canceling the same after the bid date on the application will receive zero (0) points under this round and the following round.

11) Does the infrastructure have regional impact? Consider origination and destination of traffic, functional classifications, size of service area, and number of jurisdictions served, etc.

10 – Major Impact **Appeal Score**
8 – Significant Impact
6 – Moderate Impact _____
4 – Minor Impact
2 – Minimal or No Impact

Criterion 11 - Regional Impact
The regional significance of the infrastructure that is being repaired or replaced.
Definitions:

Major Impact – Roads: Major Arterial: A direct connector to an Interstate Highway; Arterials are intended to provide a greater degree of mobility rather than land access. Arterials generally convey large traffic volumes for distances greater than one mile. A major arterial is a highway that is of regional importance and is intended to serve beyond the county. It may connect urban centers with one another and/or with outlying communities and employment or shopping centers. A major arterial is intended primarily to serve through traffic.

Significant Impact – Roads: Minor Arterial: A roadway, also serving through traffic, that is similar in function to a major arterial, but operates with lower traffic volumes, serves trips of shorter distances (but still greater than one mile), and may provide a higher degree of property access than do major arterials.

Moderate Impact – Roads: Major Collector: A roadway that provides for traffic movement between local roads/streets and arterials or community-wide activity centers and carries moderate traffic volumes over moderate distances (generally less than one mile). Major collectors may also provide direct access to abutting properties, such as regional shopping centers, large industrial parks, major subdivisions and community-wide recreational facilities, but typically not individual residences. Most major collectors are also county roads and are therefore through streets.

Minor Impact – Roads: Minor Collector: A roadway similar in functions to a major collector but which carries lower traffic volumes over shorter distances and has a higher degree of property access. Minor collectors may serve as main circulation streets within large, residential neighborhoods. Most minor collectors are also township roads and streets and may, or may not, be through streets.

Minimal or No Impact - Roads: Local: A roadway that is primarily intended to provide access to abutting properties. It tends to accommodate lower traffic volumes, serves short trips (generally within neighborhoods), and provides connections preferably only to collector streets rather than arterials.

12) **What is the overall economic health of the jurisdiction?**

10 Points
8 Points
6 Points
4 Points
2 Points

Criterion 12 – Economic Health
The District 2 Integrating Committee predetermines the applying agency's economic health. The economic health of a jurisdiction may periodically be adjusted when census and other budgetary data are updated.

13) **Has any formal action by a federal, state, or local government agency resulted in a partial or complete ban of the usage or expansion of the usage for the involved infrastructure?**

10 - Complete ban, facility closed
8 – 80% reduction in legal load or 4-wheeled vehicles only
7 – Moratorium on future development, *not* functioning for current demand
6 – 60% reduction in legal load
5 - Moratorium on future development, functioning for current demand
4 – 40% reduction in legal load
2 – 20% reduction in legal load
0 – Less than 20% reduction in legal load

Appeal Score _____

Criterion 13 - Ban
The applying agency shall provide documentation to show that a facility ban or moratorium has been formally placed. The ban or moratorium must have been caused by a structural or operational problem. Points will only be awarded if the end result of the project will cause the ban to be lifted.

14) **What is the total number of existing daily users that will benefit as a result of the proposed project?**

10 - 30,000 or more
8 - 21,000 to 29,999
6 - 12,000 to 20,999
4 - 3,000 to 11,999
2 - 2,999 and under

13,549

Appeal Score _____

Criterion 14 - Users
The applying agency shall provide documentation. A registered professional engineer or the applying agency's C.E.O must certify the appropriate documentation. Documentation may include current traffic counts, households served, when converted to a measurement of persons. Public transit users are permitted to be counted for the roads and bridges, but only when certifiable ridership figures are provided.

15) **Has the applying agency enacted the optional $5 license plate fee, an infrastructure levy, a user fee, or dedicated tax for the pertinent infrastructure?** ***(Provide documentation of which fees have been enacted.)***

5 - Two or more of the above
3 - One of the above
0 - None of the above

Appeal Score _____

Criterion 15 – Fees, Levies, Etc.
The applying agency shall document (in the "Additional Support Information" form) which type of fees, levies or taxes they have dedicated toward the type of infrastructure being applied for.

REPORT OF
PAVEMENT EVALUATION STUDY
KENWOOD ROAD AND SHAWNEE RUN ROAD
MADEIRA, OHIO

FOR

CITY OF MADEIRA
HAMILTON COUNTY, OHIO

SEPTEMBER 2007

H. C. NUTTING COMPANY
EMPLOYEE OWNED
Geotechnical, Environmental and Testing Engineers Since 1921

H. C. NUTTING COMPANY

EMPLOYEE OWNED

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS
SINCE 1921

CORPORATE CENTER
611 LUNKEN PARK DRIVE
CINCINNATI, OHIO 45226
(513) 321-5816
FAX (513) 321-0294

September 20, 2007
W.O. # 01933.016

Mr. Thomas W. Moeller
City of Madeira
7141 Miami Avenue
Cincinnati, Ohio 45243

Re: Report of Pavement Evaluation Study
Kenwood Road and Shawnee Run Road
City of Madeira, Hamilton County, Ohio

Dear Mr. Brandstetter:

The H.C. Nutting Company is pleased to submit our report of Pavement Evaluation along Shawnee Run Road and preliminary pavement evaluation along Kenwood Road in the City of Madeira, Ohio. Our services were performed in general accordance with our proposal dated August 21, 2007 and consultant agreement/authorization by City of Madeira on August 22, 2007.

The work performed for this pavement evaluation consisted of: (1) test boring layout in the field, (2) drilling of eleven shallow test borings in the existing roadway, (3) laboratory testing and engineering analyses, and (4) preparation of this report. The following paragraphs summarize a description of the project, our investigative procedures, the encountered subsurface conditions, geotechnical recommendations for roadway and subgrade improvements as necessary. An information sheet describing the basis and limitations of this study follows the text. Figures, test boring logs, summary of laboratory test data, and information describing the terminology used on the boring logs and laboratory data sheets are included in the Appendix of this report.

It should be noted that only three widely spaced borings were drilled along Kenwood Road. Therefore, the provided recommendations for remediation of Kenwood Road should be considered preliminary.

We appreciate this opportunity of providing these geotechnical services for you. Should you have any questions concerning the contents of this report or if we may be of service during construction, please contact us.

Thank you for your consideration.

Respectfully submitted,
H. C. NUTTING COMPANY

Bobby Daita, E.I.
Staff Geotechnical Engineer

Swaminathan Srinivasan, P.E.
Senior Principal/Chief Engineer

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1.0 INTRODUCTION

The H. C. Nutting Company (HCN) was retained by City of Madeira to perform Pavement Evaluation along Shawnee Run Road and preliminary pavement evaluation along Kenwood Road in Madeira, Ohio. This evaluation generally describes the existing pavement and pavement subgrade soils conditions and provides recommendations for potential remediation. The scope of our study includes a subsurface exploration consisting of 11 soil test borings (3 along Kenwood Road and 8 along Shawnee Run Road), visual classification, and laboratory testing of representative soil samples, geotechnical engineering analyses and preparation of this report.

This geotechnical report provides a summary of our site reconnaissance, existing pavement and subgrade conditions, recommendations for general site development and subgrade remediation as it pertains to the proposed roadway improvements. The Appendix of this report also includes a Site Vicinity Map (Figure 1), Test Boring Location Plan (Figure 2), test boring logs, and laboratory test results (Table 1 & 2). Also included in the Appendix are descriptions of terminology used in the test boring logs, important information regarding the basis and limitations of this study, and a form regarding the disposition of the acquired samples.

2.0 PROJECT DESCRIPTION

The project consists of evaluating the existing pavement and subgrade profile along portions of Kenwood Road and Shawnee Run Road in Madeira, Ohio. The proposed evaluation along Kenwood is approximately 3,000 ft., between Dawson Avenue and Euclid Avenue. The pavement evaluation along Shawnee Run Road is approximately 5,350 ft. between Kenwood Road and Miami Avenue. The general location and project limits along Kenwood Road and Shawnee Run Road are depicted on Figure 1 Site Vicinity Map. The pavement study along Kenwood road is considered preliminary due to the widely-spaced (approximately 1,000 ft. apart) borings.

Kenwood Road runs in a general north-south direction and has a rolling topography. Pavement distress along Kenwood Road was less frequent in comparison to Shawnee

Run Road. Based on the Typical Section Sheet for the widening of Kenwood Road that was completed by the Hamilton County Engineers Office in 1949, the original 20 ft. wide concrete pavement was widened 8.5 ft. on either side using Class D concrete and the improved pavement was covered with 1 inch thick bitumen binder course and 1 inch thick bitumen concrete surface course. The widened sections also contained a Type "A" mesh fabric sandwiched between concrete pavement and bitumen binder course.

Shawnee Run Road runs in an east-west direction between Kenwood Road and Miami Road with a small portion of its alignment in north-south direction. The alignment of Shawnee Run Road between these roads can be divided into three sections based on their topography – Section I between Kenwood Road and portion of the road in north-south direction has a rolling topography, Section II between the portion where the road continues back in a east-west direction to its intersection with Camargo Road has a downslope topography, and Section III between Camargo Road and Miami Road has an upslope topography. Section II and Section III showed frequent pavement distress features in comparison with Section I.

The existing pavement along Kenwood Road and Shawnee Run Road consist of isolated areas which have undergone distress. Based on our visual observations, the majority of pavement distress consists of longitudinal and transverse cracking, and some alligator cracking. Occasional potholes and/or depressions were observed along Kenwood Road and Shawnee Run Road. "Troughing" within the wheel paths was also observed along Shawnee Run Road. Both Kenwood Road and Shawnee Run Road showed indications of pavement patching due to installation of utilities along the length of the road on both sides of the pavement. In general, the existing pavement along Shawnee Run Road exhibited more widespread distress as a result of subgrade deterioration. The existing pavement along Kenwood Road and Shawnee Run Road shows features of pavement patching performed subsequent to utility installation along the roadway alignment. Details regarding the backfilling of utility excavation and pavement patching were not reviewed.

The project description information was based on our site reconnaissance, the information provided, and review of the available project plans provided by Brandstetter

Carroll, Inc. If any of the above information needs modification, please notify H. C. Nutting so that we may review our recommendations and provide any necessary changes.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 Field Exploration

A total of 11 shallow soil test borings were drilled for this geotechnical study for the evaluation of the existing pavement and subgrade soils. The test boring locations were located in the field by HCN personnel. Test borings K-1, K-2 and K-3 were drilled along Kenwood road between Dawson Avenue and Euclid Avenue and test borings P-1 to P-8 were drilled along Shawnee Run Road between Kenwood Road and Miami Avenue. Test borings along Kenwood Road were approximately 1,000 ft. apart and those on Shawnee Run Road were approximately 500 to 700 ft. apart. The test boring locations included a combination of areas with and without distress. The approximate locations of the test borings are illustrated on Figure 2, Test Boring Location Plan, in the Appendix of this report. The following table summarizes the location of test boring with respect to the nearest street address.

Test Boring Locations

Boring	Lane	Nearest House
K-1	Southbound	6929 Kenwood Road
K-2	Northbound	6830 Kenwood Road
K-3	Northbound	6662 Kenwood Road
P-1	Eastbound	6506 Shawnee Run Road
P-2	Westbound	6715 Shawnee Run Road
P-3	Eastbound	6941Shawnee Run Road
P-4	Westbound	7137 Shawnee Run Road
P-5	Eastbound	7361 Shawnee Run Road
P-6	Eastbound	7561Shawnee Run Road
P-7	Westbound	Near Miami Avenue
P-8	Westbound	7200 Shawnee Run Road

The test borings were drilled between August 30 and September 4, 2007 using truck mounted rotary drilling equipment. Traffic control was necessary to access and drill the test borings and was provided by the City of Madeira.

Pavement cores were obtained at each test boring location and the thickness of granular base was noted to the nearest 1/4th of an inch. Boreholes were then advanced and stabilized using hollow-stem augers and Shelby tube samples (in accordance with ASTM D 1587) of the subgrade soils immediately below the pavement section and granular base were obtained at each of the test boring locations. Continuous sampling was then accomplished using the Standard Penetration Test procedure (ASTM D 1586). This procedure involves driving a 2 inch O.D. by 1 3/8 inch I.D. split-spoon sampler with a 140 lb. hammer falling 30 inches. The number of blows required for each 6 inches of penetration is recorded; the Standard Penetration Test result, or N-value, is the number of blows for the final 12 inches of penetration within each driving interval. These "split-spoon" samples were obtained continuously to the boring termination depth. Test borings extended to depths of about 6.3 to 7.5 feet below existing site grades. All soil samples were stored in air-tight jars to preserve moisture and integrity.

Four representative bag samples (SB-1 to SB-4) were obtained within the upper 3 ft. of subgrade soils near the test borings as described in the following table.

Bag Samples

Bag Samples	Nearest Borings
SB-1	K-1,K-2, K-3
SB-2	P-1, P-2, P-3
SB-3	P-5, P-6, P-7
SB-4	P-4, P-8

Upon completion of the drilling activities, the boreholes were backfilled with the drill cuttings and patched at the existing roadway surface. Groundwater levels were observed during and at completion of the drilling activities. Since the boreholes were backfilled immediately upon completion for safety reasons, long-term (24-hour) water levels were not obtained for this project.

3.2 Laboratory Testing

Upon completion of drilling operations, all samples were returned to our Soil Mechanics Laboratory. Each sample was examined and visually classified by the project geotechnical engineer in accordance with the USCS Soil Classification System. Laboratory tests consisting of natural moisture content determinations were performed on the obtained split-spoon samples. In situ unit weight determinations were performed on obtained Shelby tube samples. Atterberg Limits test (3-point) was performed on selected Shelby tube and bag samples. Standard Proctor test was performed on three bag samples.

The test boring logs were reclassified by the project geotechnical engineer based on the drill foreman's field notes, the laboratory examination of the recovered samples, and the results of the laboratory tests. The reclassified test boring logs are included in the Appendix.

4.0 ENCOUNTERED SUBSURFACE CONDITIONS

The test borings generally encountered asphalt pavement and concrete pavement underlain by granular base or broken concrete at surface. Existing fill soils and natural overburden cohesive soils were encountered below the surficial material to the explored test boring depths. The following paragraphs provide a brief description of the encountered subsurface conditions in order of increasing depth below existing grade.

4.1 Surficial Materials

The surficial materials at the test boring locations generally consisted of asphalt pavement and concrete pavement (along Kenwood Road) underlain by granular base or broken concrete. The granular base consisted of crushed limestone, with sand or sand and gravel.

Along Kenwood Road the thickness of asphalt pavement varied between 2.75 and 10 inches. At test borings K-2 and K-3, 7.5 inches thick concrete pavement with a

reinforcing mesh (1/4" bars both ways) was encountered beneath the asphalt pavement. Granular base with thickness varying between 4 and 8 inches was encountered below the asphalt pavement at test borings K-1 and K-2

Along Shawnee Run Road, the thickness of asphalt pavement varied between 6 and 17 inches. Concrete pavement encountered at boring P-8 was 8.5 inches thick. Below the asphalt pavement, broken or crushed concrete was reported at test borings P-1, P-2, P-3, and P-5 and granular base was reported at test borings P-4, P-6, P-7, and P-8. The thickness of broken concrete varied between 5 and 13 inches and that of granular base varied between 8 and 18 inches.

The following table summarizes the thickness of asphalt pavement and underlying granular base/concrete.

Surficial Conditions at Test Borings

Test Boring	Asphalt Pavement Thickness (in.)	Concrete Pavement Thickness (in.)	Base Material	Base Material Thickness (in.)
K-1	10	NE	Granular Base	8
K-2	5 (2½ + 2½)	7 ½	Granular Base	3
K-3	2 ¾	7 ¼	NE	NE
P-1	9 ¼ (1¼ +2½ +5½)	NE	Broken Concrete	7
P-2	6 (1+ 2 ½ +2 ½)	NE	Broken Concrete	11
P-3	17 (2½ +2 ½+2 ½+9 ½)	NE	Broken Concrete	13
P-4	9	NE	Granular Base	8
P-5	10½	NE	Broken Concrete	5
P-6	8½ (1¼+3 ¾+3 ½)	8½	Granular Base	10
P-7	7 (3 ½+ 3 ½)	NE	Granular Base	18
P-8	7	NE	Granular Base	10

NE: Not Encountered

4.2 Existing Fill

Along Kenwood Road existing fill was encountered at all of the test borings below the surficial material and extended to depths of about 3.5 to 5.5 ft. below existing grades. The encountered fill was visually classified as lean clay and clay and contained variable amounts of sand and gravel. Based on pocket penetrometer readings (an approximation of unconfined compression strength) that varied between 1.5 and 4 tsf,

the encountered fill was stiff to very stiff in consistency. Laboratory tested natural moisture contents of existing fill soils varied between 18% and 29%.

Along Shawnee Run Road, existing fill was encountered below surficial material at test borings P-2, P-3, P-4, and P-6 and extended to depths of about 3.4 to 6.3 ft. below existing grades. The following table summarizes the depth and thickness of the encountered existing fill.

Encountered Fill Thickness

Test Boring	Fill Thickness (ft.)	Bottom of Fill Depth (ft.)
K-1	4	5.5
K-2	2.3	3.5
K-3	2.7	3.5
P-2	2	3.4
P-3	2	4.5
P-4	3.6	5
P-6	4.9	6.3*

*-Boring was terminated in possible fill material

The encountered fill at borings drilled along Shawnee Run Road was predominantly cohesive and was visually classified as silty clay, lean clay, and clay and contained variable amounts of sand, gravel, shale and limestone fragments. The encountered fill was soft to stiff in consistency with recorded pocket penetrometer reading values varying between 0.5 and 2 tsf. SPT N-values of cohesive fill soils varied between 7 and 59 blows per foot (bpf). Granular fill encountered at boring P-6 was visually classified as gravel and cobbles and clayey sand and gravel. The granular fill was loose to medium dense based on the compactness of the Shelby tube sample and SPT N-value of 14 bpf. Laboratory tested natural moisture contents of fill soils varied between 15% and 30%. Atterberg Limits tests performed on a Shelby tube sample of existing fill showed Liquid Limit and Plasticity Index of 26 and 5, respectively.

The encountered fill along both Kenwood Road and Shawnee Run Road was variable in consistency/compactness and we have not reviewed any records showing that the fill was placed and compacted in a controlled manner.

4.3 Natural Overburden Soils

Beneath the existing fill or surface material natural overburden cohesive and granular soils were encountered at all of the test borings except P-6. The encountered cohesive soils were of glacial and residual origin. Glacial till is an unsorted, unstratified mixture of silt, sand, gravel, and clay which was deposited discontinuously by glacial ice moving over bedrock or older glacial deposits. Residual soils are derived from complete decomposition or weathering of the parent rock. Residual clays encountered at the borings were from complete decomposition of shale bedrock. The encountered granular soils were of glacial outwash origin.

Along Kenwood Road, the encountered cohesive soils were visually classified as lean clay, clay, and fat clay and contained variable amounts of sand and limestone fragments. All three test borings were terminated within natural cohesive soils at a depth of 6.5 ft. The encountered cohesive soils were soft to very stiff in consistency with recorded pocket penetrometer readings varying between 1 and 4 tsf. SPT N-values of cohesive soils varied between 2 and greater than 50 bpf. The higher blows counts can be attributed to the presence of limestone fragments. Some of the samples with high blow counts were very moist to wet resulting in a soft consistency. Laboratory tested natural moisture contents of natural cohesive soils encountered at test borings along Kenwood Road varied between 18% and 25%.

All the test borings along Shawnee Run Road except boring P-6 were terminated within natural overburden soils. Natural overburden soils encountered along Shawnee Run Road were predominantly cohesive in nature and were visually classified as lean clay, clay, and fat clay and contained variable amounts of sand and limestone fragments. The encountered natural cohesive soils were medium stiff to very stiff based on pocket penetrometer readings that varied between 1 and 4 tsf. SPT N-values of natural cohesive soils varied between 8 bpf and greater than 50 bpf with the higher blows counts possibly due to the presence of limestone fragments within the residual clays. Laboratory tested natural moisture contents of natural cohesive soils encountered at test borings along Shawnee Run Road varied between 17% and 30%. Atterberg Limits

tests performed on Shelby tube sample of natural cohesive soils obtained at P-5 showed Liquid Limit and Plasticity Index of 32 and 16, respectively.

Natural granular soil visually classified as clayey sand was encountered at test boring P-1 from depths of 3.4 ft. to the boring termination depth of 6.4 ft. The encountered clayey sand was wet and based on a SPT N-value of 18 bpf medium dense in compactness.

4.4 Groundwater

Groundwater observations were made at all the test boring locations during and upon completion of drilling the test borings. The boreholes were immediately backfilled with auger cuttings following the removal of augers and patched at the roadway surface for safety considerations.

Along Kenwood Road, groundwater was encountered during drilling at test borings K-1 and K-3 at depths of about 5.5 ft. and 5 ft. respectively. No water or "dry" conditions were reported at all the three test borings upon completion of drilling operations.

During and upon completion of drilling, water was not encountered at any of the test borings drilled along Shawnee Run Road and no water or "dry" conditions were reported. However, some of the obtained Shelby tube samples showed zones of wet soils due to perched water. A "dry" condition is reported when no water is observed in the open borehole or on the sampling tools.

The groundwater observations are often not representative of the actual groundwater conditions since the boreholes are left open for a relatively short period of time groundwater levels will vary based on seasonal conditions, surface runoff, evaporation, precipitation, and other related hydrogeologic factors. Furthermore, trapped or perched water is often encountered within the existing fill and/or at the fill/natural interface. Based on the encountered conditions at our test borings, we anticipate that wet subgrade conditions due to perched water in fill might be encountered beneath the existing asphalt pavement and granular base.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Pavement and Subgrade Evaluation

Pavement design is a function of several variables including subgrade strength, drainage, traffic type and volume, amount of truck traffic, and reasonable levels of statistical reliability. Based on these factors, a structural number (SN) is determined, which is in turn used to calculate a pavement section that will satisfy the design parameters. We have not reviewed the pavement design for Kenwood and Shawnee Run Roads; however, based on our understanding of pavement design and experience, we believe that the distress observed is a combination of marginal/poor subgrade conditions and an insufficient design pavement section. The observed distress is likely the result of several attributing factors. Based on our site reconnaissance, and test boring and laboratory results, we offer the following discussion outlining the most likely causes of the observed pavement distress.

Based on the encountered conditions in the test borings performed for this study, the existing pavement section and base material is variable. Pavement thickness varied between 2¾ and 17 inches and base material varied between 3 and 8 inches. In addition to the variable thickness, the pavement and base material types also varied. Both asphalt and mesh reinforced concrete pavement sections were encountered. Base material consisted of both granular aggregate and broken/degraded concrete. Variations in type and thickness could be related to construction methods, dissimilar repair and replacement methods, and/or dissimilar replacement methods following underground utility installation. Each of the variations of pavement/base course type and thickness will result in a variety of structural numbers, some of which do not satisfy traffic loading/volume conditions.

Although the encountered pavement may have been initially adequately designed, traffic volume, percentage of trucks, and projected growth may have been exceeded the design assumptions and projections. A typical pavement design life is 20 years. We have not reviewed as-built documents, but it could be that the design life of the

pavement has been exceeded. Individually or in combination, an insufficient initial design and/or exceeded pavement life could result in the observed pavement distress.

Insufficient compaction of soils following underground utility installation can also lead to distress within the pavement. Utility trench type patterns were observed along Kenwood Road, which indicate differential settlement between the utility and surrounding pavement areas. Backfill soils not properly placed and/or minimal pavement replacement will result in distress at the pavement surface.

Based on the pavement section described on Hamilton County Engineers 1949 drawings for Kenwood Road, concrete pavement was utilized and has since been overlain with asphalt. However, we only encountered concrete in two of the three widely-spaced test borings performed along Kenwood Road. Variable pavement types will respond and wear differently to the traffic loading. If not properly "jointed", longitudinal cracking along the joints of the different types will develop.

The alligator, ruts, and deflections observed along the roadways indicate that the underlying subgrade soils are not providing sufficient support to the pavement section. Distress within the subgrade reflects up into the pavement. Consequently, without proper attention to the subgrade soils, pavement distress also reflects through the repaired sections. The subgrade distress is attributed to fatigue over time, poor drainage and subsequent seasonal cycles of freeze/thaw, which results in seasonal volume change within the subgrade soils.

Although the above reasons have all likely attributed to the observed pavement distress and failure along Kenwood and Shawnee Run Roads, deterioration to the subgrade soils is likely the primary attributor. The subgrade conditions are further discussed below.

Kenwood Road

The subgrade soils along Kenwood Road generally consisted of moderately plastic cohesive existing fill soils. Standard Proctor test performed on a bag sample obtained between depths of 1 and 3 ft. near test borings K-1, K-2, and K-3 showed Maximum Dry

Density (γ_{dmax}) and Optimum Moisture Content (OMC) of 109.5 pcf and 16.9%. Atterberg Limits tests performed on the bag sample showed Liquid Limit and Plasticity Index of 37 and 19, respectively. A comparison of the in situ dry unit weights and natural moisture contents against Standard Proctor results is provided in the following table.

In situ Moisture and Density Data Along Kenwood Road

Test Boring	In situ Moisture (%)	Δ OMC (%)	Dry Unit Weight (pcf)	$\Delta\gamma_{dmax}$ (pcf)	(γ_d/γ_{dmax})%
K-1	26	+9.1	97.7	-11.8	89
K-2	29	+12.1	95.7	-13.8	87
K-3	18	+1.1	104.6	-4.9	96

Kenwood Road

In general, pavement subgrades should be compacted to 98% to 100% of maximum dry unit weight at moisture contents within ±3% of optimum moisture content. The upper 12" of the subgrade soil should be compacted to 100% Standard Proctor maximum dry density. From the table, the existing subgrade soils are generally wet of optimum with in situ moisture contents as high as 12% greater than OMC. The dry unit weights of the in situ soils is lower than the maximum dry unit. Pavement subgrades compacted wet of optimum at low dry unit weights will result in long-term settlement and shear failure of the subgrade which emerge to the pavement surface as ruts and other distress patterns.

Shawnee Run Road

The subgrade soils beneath the surficial pavement consisted of either existing fill or natural cohesive soils. Standard Proctor test performed two bag samples obtained between depths of 1 and 3 ft. near test borings P-1, P-2, and P-3 (SB-2) and near test borings P-5, P-6, P-7 (SB-3) showed Maximum Dry Density (γ_{dmax}) and Optimum Moisture Content (OMC) of 108.6 pcf and 16.7% and 107.2 and 18.6%, respectively. Atterberg Limits tests performed on bag samples SB-2 and SB-3 showed Liquid Limit and Plasticity Index of 33 and 16, and 39 and 121, respectively. The following table compares the in situ dry unit weights and natural moisture contents against Standard Proctor results.

In situ Moisture and Density Data Along Shawnee Run Road

Test Boring	In situ Moisture (%)	Δ OMC (%)	Dry Unit Weight (pcf)	Δ γ_{dmax} (pcf)	(γ_d /γ_{dmax})%
P-1	23.9	+7.2	99.8	-8.8	92
P-2	24.1	+7.4	120.5	+11.9	111
P-3	NA	NA	NA	NA	NA
P-4	18.9	+2.2	103.8	-4.8	96
P-5	24.8	+6.2	101.7	-5.5	95
P-6	NA	NA	NA	NA	NA
P-7	23.5	+4.9	101.3	-5.9	94
P-8	34.1*	+17.4	69.1*	39.5	64

NA-Not Available due to zero recovery in Shelby tube *-the sample was organic

The cohesive soil encountered at the pavement subgrade level at test boring P-8 contained organics. The tested moisture content was high and the unit weight was low due to the presence of organics. The presence and extent of organics in the vicinity of test boring P-8 should be further evaluated in the field during construction.

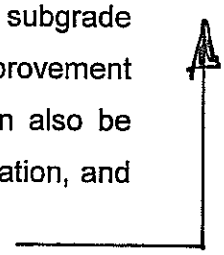
The in situ moisture contents of the subgrade soils were generally 2 to 17% greater than the OMC in comparison to the required ±3% OMC range. Also, in situ dry unit weights were generally low (between 92 and 96%) in comparison to the required 98 to 100% of γ_{dmax}. The subgrade soils are not at the desired levels of moisture content and dry unit weight requirements for adequate performance of pavement.

5.2 Pavement and Subgrade Remediation

Based on our site reconnaissance, it appears that Kenwood Road and Shawnee Run Road were excavated for various utility installations. These excavations were backfilled and the pavement was patched. However, the backfill was probably not likely adequately compacted as structural fill and the patched pavement section was probably not equivalent to the original pavement section. In addition, poor drainage provisions have resulted in zones of wet subgrade soils with perched water. It is our opinion that the current pavement distress is a result of a variable and often insufficient pavement section underlain by subgrade soils which are wet of optimum with low dry unit weights. Additionally, insufficient and improper drainage provisions might have resulted in

pavement distress. The effects of poor subgrade conditions will be reflected on an asphalt overlay over the existing pavement in the form of distress. Therefore, remedial measures should result in a new pavement section that will be supported on well compacted and controlled structural fill. A new pavement section with appropriate drainage provisions designed for the anticipated traffic loads should be used for repaving over the structural fill subgrade.

The upper 2 ft. of pavement subgrade soils should be reworked and recompacted as structural fill. The encountered fill soils at test borings are suitable for reuse as structural fill provided they are moisture conditioned to near OMC moisture contents. Moisture conditioning can be achieved by discing and drying. However, based on the time of year of construction and project schedule, discing and drying of the subgrade soils may not be the most efficient method. Alternative subgrade improvement methods like chemical modification and geogrid and stone stabilization can also be considered. Recommendations for structural fill placement, chemical modification, and geogrid stabilization are provided in the following paragraphs.



5.3 Site Preparation & Structural Fill Placement

Site preparation should begin with stripping of asphalt pavement and granular base. The stripping, clearing, and grubbing procedures should be performed in accordance with current ODOT construction specifications. The granular base can be reused during repaving operations. The concrete encountered should be adequately broken to the size of allowable granular base material size. The processed concrete can be used as a fill material but is not suitable for use as a granular base below pavement section. It is anticipated that existing fill or natural cohesive soils will be encountered at the subgrade level upon performing this initial site preparation.

Following clearing, grubbing, stripping of existing surficial material, and removal of construction debris we recommend a 2 ft. undercut of the subgrade soils. The exposed soils upon performing the undercut operation should proofrolled prior to the placement of new structural fill. The proofroll should be performed with several passes of heavy construction equipment, such as a minimum 20-ton loaded tandem axle dump truck or

heavy-duty sheepsfoot roller. These operations will delineate any areas which yield, rut, or pump that may require further undercutting or other stabilizing methods. We recommend that a geotechnical field representative observe proofrolling and subgrade preparation so that they may evaluate the subgrade soils suitability and adequacy and determine if any additional undercut is required.

The undercut subgrade should be backfilled with new structural fill. The undercut soils can be reused as structural fill provided they are subjected to moisture conditioning. Cohesive fill soils with organics were encountered at boring P-8. Any such soils if encountered should be blended with other soils such that organic content of the final product is less than 4%. Based on our test borings, the subgrade soils were generally wet of optimum. Moisture conditioning can be performed by discing and drying the undercut soil. It is important to note this work should be performed when long periods of dry, warm weather are forecast. The subgrade remediation can also be achieved by chemical modification or with the use of geogrid and stone; details of which are provided in the following section. Any proposed borrow source for structural fill should be evaluated by the project geotechnical engineer prior to trucking to the site.

Structural fill should be placed in general accordance with current specifications. Material used as structural fill should be free of organic material (less than about 4 percent), vegetation, or other deleterious substances. All fill required in structural areas (beneath the roadway footprint and at least 18 inches beyond the proposed edge of pavement) should be compacted to at least 98 percent Standard Proctor maximum dry density (ASTM D 698). The upper 1 foot of the pavement subgrade should be compacted to at least 100 percent of the Standard Proctor density. Cohesive and granular type fill material can be placed in maximum 8 inch loose, horizontal lifts prior to compaction, provided heavy-duty, self-propelled compactors are used. For small or confined areas, or where small walk behind rollers, plate compactors, or tampers are used, loose lift thicknesses should be limited to 4 to 6 inches.

Ideally, the fill material should have a liquid limit of less than 40 and contain fragments less than 4 inches in maximum dimension. The use of the moderately higher plasticity clay (liquid limit greater than 40) as structural fill in the upper foot of the subgrade

should be avoided. Each fill lift should be brought within a moisture content range of approximately 3 percent of its optimum moisture content. Each fill lift should be compacted, tested by geotechnical personnel and approved, prior to placing any subsequent fill.

5.4 Subgrade Treatment

As mentioned earlier, the undercut soils can be reused as structural fill provided they are subjected to moisture conditioning or stabilized. Chemical modification and geogrid stabilization are two alternative methods that can be adopted to rework the subgrade soils to make them suitable for reuse as structural fill.

Geogrid Stabilization

The geogrid stabilization option requires the roadway subgrade soil be undercut or established a minimum of 18" (in three lifts) below the proposed subgrade elevation. A layer of Tensar BX-1200 geogrid should be placed directly on the soil subgrade, and then a minimum 18" of granular base course of crushed limestone (No. 53 stone) should be placed directly over the geogrid. Consideration may also be given to "punching" a layer of No. 2 stone into the subgrade to provide additional support and a capillary break. Then the layer of geogrid may be placed on top of the No. 2 stone, and the 18" of granular base course of crushed limestone should be placed directly over the geogrid. The granular base course of crushed limestone should be placed in three, six-inch compacted lifts, compacted to at least 98% Standard Proctor Density.

Chemical Modification

The upper 16" of the exposed subgrade soils can be subjected to in-place chemical modification to create a firm subgrade. Chemical modification will dry/stabilize the soil and will provide more 'weather protection' for the exposed subgrade than untreated soil. To properly realize the benefits that are produced when chemically modifying soils, proper construction techniques must be utilized by a specialty contractor. Lime is often used to modify clay soils; however, due to the low plasticity of the on-site soils, cement or a lime-cement mixture may be more beneficial. This modification work should be done on a performance-specification basis. The actual lime/cement percentage added may vary and will likely involve some experimentation. It is for this reason that we

strongly suggest using a subcontractor who is experienced in lime/cement modification to perform the work. Typically for drying purposes, it has been our experience to use approximately 3% to 4% lime or cement per dry unit weight of the soils to modify the soils to within optimum moisture content.

5.5 Pavement Design Considerations

Following pavement subgrade preparation by reusing the existing fill as structural fill upon moisture condition in accordance with our recommendations design of asphaltic concrete pavement can be based on a CBR value of 4 and a resilient modulus of 4800 psi. Higher CBR value of 6 can be used for pavement subgrade modified following geogrid stabilization or chemically modified subgrade soils. For rigid concrete pavement, a modulus of subgrade reaction of 125 pci can be used for the design. Again, if the pavement subgrade is stabilized with geogrid or lime/cement modified, a modulus of subgrade reaction of 150 pci can be used.

Proper drainage of the pavement subgrade will extend pavement life. The new pavement section should include a granular base below the asphalt pavement. Sloping or crowning the new subgrade should be considered for positive drainage. Additionally, surface water runoff from areas adjacent to and sloping towards the pavement should be intercepted, collected and not permitted to flow onto the pavement or infiltrate the pavement base and subgrade material. The control and disposal of surface and subsurface water is a very important part of pavement design. It is our opinion that the existing pavement problems are most probably caused by prolonged retention of water on the surface and within or beneath the pavement. Therefore, a drainage ditch or edge underdrain should be considered to intercept seepage and water moving down the subgrade slope.

6.0 CONSTRUCTION AND QUALITY CONTROL CONSIDERATIONS

It is recommended that all aspects of this roadway reconstruction be performed in accordance with the current ODOT standards. It is recommended that testing and inspection by qualified geotechnical personnel be utilized during the construction phase of the project. These services should be performed during proof rolling activities, undercutting and placement of any structural fill and reconstruction of pavement. We request the opportunity of remaining involved with the project through the construction phase by providing materials testing and monitoring services. Testing and inspection is considered essential to evaluate site and construction conditions as they relate to these findings and recommendations.

The test borings along Kenwood Road were widely spaced and hence the recommendations provided for Kenwood Road should be considered preliminary. A final pavement evaluation study with more closely-spaced test borings is recommended.

LIMITATIONS OF LIABILITY

OUR WARRANTY

We warrant that the services performed by H. C. Nutting Company are conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE MADE. While the services of H. C. Nutting Company are a valuable and integral part of the design and construction teams, we do not warrant, guarantee, or insure the quality or completeness of services provided by other members of those teams, the quality, completeness, or satisfactory performance of construction plans and specifications which we have not prepared, nor the ultimate performance of building site materials.

SUBSURFACE EXPLORATION

Subsurface exploration is normally accomplished by test borings; test pits are sometimes employed. The method of determining the boring location and the surface elevation at the boring is noted in the report. The information is represented on a drawing or on the boring log. The location and elevation of the boring should be considered accurate only to the degree inherent with the method used.

The boring log includes sampling information, description of the materials recovered, approximate depth of boundaries between soil and rock strata and groundwater data. The log represents conditions specifically at the location and time the boring was made. The boundaries between different soil strata are indicated at specific depths; however, these depths are in fact approximate and dependent upon the frequency of sampling. The transition between soil strata is often gradual. Water level readings are made at the times and under the conditions stated on the boring logs. Water levels change with time and season. The borehole does not always remain open sufficiently long for the measured water level to coincide with the groundwater table.

LABORATORY AND FIELD TESTS

Tests are performed in accordance with specific ASTM Standards unless otherwise indicated. All determinations included in a given ASTM Standard are not always required and performed. Each test report indicates the measurements and determinations actually made.

ANALYSIS AND RECOMMENDATIONS

The geotechnical report is prepared primarily to aid in the design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it is not intended to determine the cost of construction or to stand alone as a construction specification.

Report recommendations are based primarily on data from test borings made at the test locations shown on a boring location drawing included. Soil variations may exist between borings and these variations may not become evident until construction. If significant variations are then noted, the geotechnical engineer should be contacted so that field conditions can be examined and recommendations revised if necessary.

The geotechnical report states our understanding as to the location, dimensions and structural features proposed for the site. Any significant changes in the nature, design, or location of the site improvements MUST be communicated to the geotechnical engineer so that the geotechnical analysis, conclusions, and recommendations can be appropriately adjusted.

The geotechnical engineer should be given the opportunity to review all drawings that have been prepared based on his recommendations.

CONSTRUCTION MONITORING

Construction monitoring is a vital element of complete geotechnical services. The field engineer/inspector is the owner's "representative" observing the work of the contractor, performing tests as required in the specifications, and reporting data developed from such tests and observations. THE FIELD ENGINEER OR INSPECTOR DOES NOT DIRECT THE CONTRACTOR'S CONSTRUCTION MEANS, METHODS, OPERATIONS OR PERSONNEL. He does not interfere with the relationship between the owner and the contractor and, except as an observer, does not become a substitute owner on site. He is responsible for his own safety but has no responsibility for the safety of other personnel at the site. He is an important member of a team whose responsibility is to watch and test the work being done and report to the owner whether that work is being carried out in general conformance with the plans and specifications.

APPENDIX

BORING TERMINOLOGY
SOIL CLASSIFICATION
FIGURE 1: SITE VICINITY MAP
FIGURE 2: TEST BORING LOCATION PLAN
TEST BORING LOGS
TABLE I: SUMMARY OF LABORATORY TEST DATA
TABLE II: TABULATION OF UNDISTURBED DATA
SAMPLE DISPOSITION

A description of terminology and symbols used in the logs of test borings, and a copy of ASTM D 2487, "Classification of Soils for Engineering Purposes", are included in the following two pages.

Readers of this report who wish an in-depth discussion on the basis for geotechnics, including procedures used in subsurface exploration, laboratory testing, and geotechnical analyses are referred to The H. C. Nutting Geotechnical and Test Engineering Manual. Those readers not having a copy of this manual may obtain one at nominal cost by contacting The H. C. Nutting Company at (513) 321-5816.

STANDARD PENETRATION TEST

THE PENETRATION RESISTANCE OR N-VALUE AS IT IS COMMONLY REFERRED TO IS THE SUMMATION OF THE NUMBER OF BLOWS REQUIRED TO DRIVE TWO SUCCESSIVE 6" PENETRATIONS OF THE 2" O.D. SPLIT BARREL SAMPLER. THE SAMPLER IS DRIVEN WITH A 140 LB. WEIGHT FALLING 30" AND IS SEATED TO A DEPTH OF 6" BEFORE COMMENCING THE STANDARD PENETRATION TEST.

THE STANDARD PENETRATION TEST IS PERFORMED IN COMPLIANCE WITH PROCEDURES AS SET FORTH IN ASTM D-1586.

TERMINOLOGY

GRAIN SIZE (PER ASTM D-2487)

SOIL FRACTION		PARTICLE SIZE	U.S. STANDARD SIEVE SIZE
BOULDERS		LARGER THAN 12" (300mm)	LARGER THAN 12"
COBBLES		3" (75 mm) TO 12" (300 mm)	3" TO 12"
GRAVEL:	COARSE	¾" (19 mm) TO 3" (75 mm)	¾" TO 3"
	FINE	4.75 mm TO 19mm	#4 TO ¾"
SAND:	COARSE	2.00 mm TO 4.75 mm	#10 TO #4
	MEDIUM	0.425 mm TO 2.00 mm	#40 TO #10
	FINE	0.075 mm TO 0.425 mm	#200 TO #40
FINES:	(SILTS & CLAYS)	SMALLER THAN 0.075 mm	SMALLER THAN #200

PLASTICITY CHARACTERISTICS DIFFERENTIATE BETWEEN SILTS AND CLAYS

RELATIVE DENSITY OF GRANULAR SOILS

TERM*	N VALUE
VERY LOOSE	0 – 4
LOOSE	5 – 10
MEDIUM DENSE	11 – 29
DENSE	30 – 50
VERY DENSE	OVER 50

*THESE ARE USUALLY BASED ON AN EXAMINATION OF SOIL SAMPLES, PENETRATION RESISTANCE AND SOIL DENSITY DATA.

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

(Per ASTM D2488)

PROPORTIONAL TERM	DEFINING RANGE BY PERCENTAGE OF WEIGHT
TRACE	<5%
FEW	5 TO 10%
LITTLE	15 TO 25%
SOME	30 TO 45%

FOR RELATIVE PERCENTAGE OF GRAVELS, SAND AND FINES.

CONSISTENCY OF COHESIVE SOILS

TERM	N VALUE*	STRENGTH (QU, TSF)	IDENTIFICATION PROCEDURE
VERY SOFT	0 – 2	0 – 0.25	EASILY PENETRATED SEVERAL INCHES BY FIST.
SOFT	3 – 4	0.25 – 0.5	EASILY PENETRATED SEVERAL INCHES BY THUMB
MEDIUM STIFF	5 – 8	0.5 – 1.0	PENETRATED SEVERAL INCHES BY THUMB WITH MODERATE EFFORT.
STIFF	9 – 15	1.0 – 2.0	READILY INDENTED BY THUMB, BUT PENETRATED WITH GREAT EFFORT
VERY STIFF	16 – 30	2.0 – 4.0	READILY INDENTED BY THUMBNAIL
HARD	OVER 30	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

*N-value correction is approximate and typically only used in absence of actual field or laboratory strength data.

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

(Per ASTM D2488)

DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL IS BELOW WATER TABLE

SYMBOLS

DRILLING AND SAMPLING

RC –	ROCK CORING: SIZE NW, NX = 2-1/8" diameter
RQD –	ROCK QUALITY DESIGNATION
FT –	FISH TAIL
DC –	DRIVE CASING
C –	CASING SIZE NW, 4", HW, 6"
CW –	CLEAR WATER
DM –	DRILLING MUD
HAS –	HOLLOW STEM AUGER
FA –	FLIGHT AUGER
HA –	HAND AUGER
COA –	CLEAN-OUT AUGER
SS –	2" DIAMETER SPLIT BARREL SAMPLE
ST –	3" DIAMETER THIN-WALLED TUBE SAMPLE
PT –	3" DIAMETER PISTON TUBE SAMPLE
AS –	AUGER SAMPLE
WS –	WASH SAMPLE
PTS –	PEAT SAMPLE
PS –	PITCHER SAMPLE
NR –	NO RECOVERY
S –	SOUNDING
PMT –	BOREHOLE PRESSUREMETER TEST
VS –	VANE SHEAR TEST
WPT –	WATER PRESSURE TEST
ATV –	ALL TERRAIN VEHICLE
R –	REFUSAL CONDITION

LABORATORY TESTS

PP –	PENETROMETER READING, TONS/SQ. FT.
QU –	UNCONFINED STRENGTH, TONS/SQ. FT.
W –	MOISTURE CONTENT, %
LL –	LIQUID LIMIT, %
PL –	PLASTIC LIMIT, %
SL –	SHRINKAGE LIMIT, %
LOI –	LOSS ON IGNITION, %
D –	DRY UNIT WEIGHT, LBS./CU. FT.
PH –	MEASURE OF SOIL ALKALINITY OR ACIDITY

WATER LEVER MEASUREMENT

NW –	NO WATER ENCOUNTERED
WD –	WHILE DRILLING
BCR –	BEFORE CASING REMOVAL
ACR –	AFTER CASING REMOVAL
CM –	CAVED AND MOIST
BF –	BACKFILLED UPON COMPLETION

NOTE: WATER LEVEL MEASUREMENTS SHOWN ON THE BORING LOGS REPRESENT CONDITIONS AT THE TIME INDICATED AND MAY NOT REFLECT STATIC LEVELS, ESPECIALLY IN COHESIVE SOILS

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487
(Based on Unified Soil Classification System)

		Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]		Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean gravels Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with Fines More that 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands More than 50% coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well graded sand [I]
			$Cu > 6$ and/or $1 < Cc < 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less that 50	Inorganic	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
		organic	PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
			Liquid limit – oven dried / Liquid limit – not dried < 0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic silt [K,L,M]
		organic	Liquid limit – oven dried / Liquid limit – not dried < 0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to the group name.

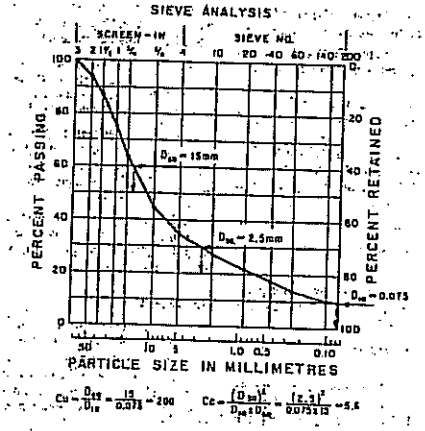
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to the group name.

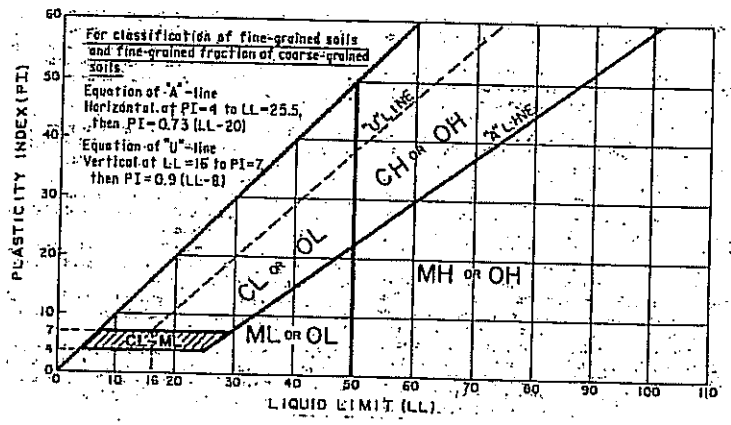
[N] PI ≥ 4 and plots on or above "A" line

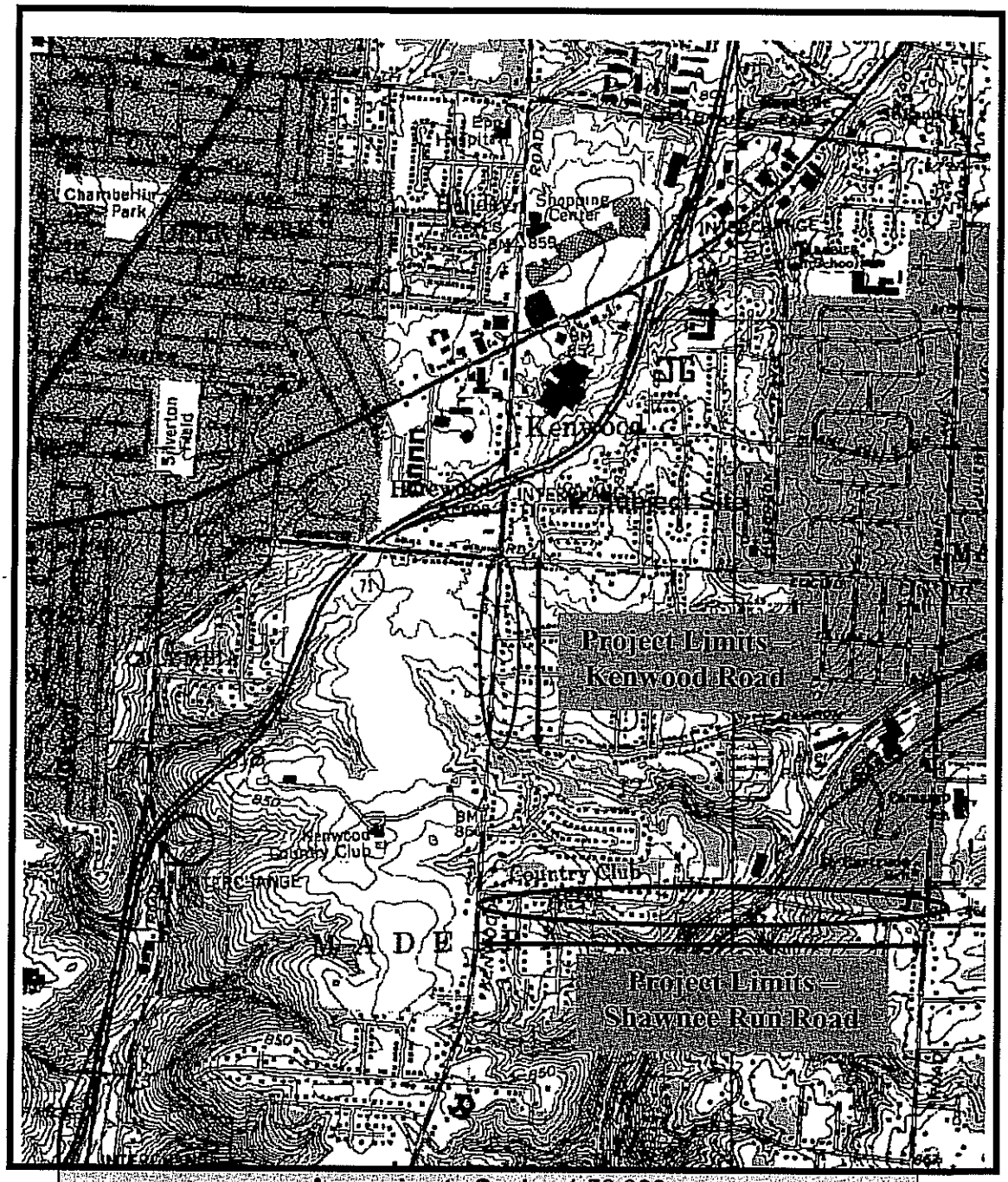
[O] PI ≤ 4 or plots below "A" line

[P] PI plots on or above "A" line

[Q] PI plots below "A" line







Approximate Scale: 1:50,000

Base map was copied from the U.S. Geological Survey Topographic Map of Cincinnati [East], OH Quadrangle, 1988

W.O. 01933.016

H. C. Nutting Company
Geotechnical, Environmental and Testing Engineers Since 1921

Site Vicinity Map
Client: City of Madeira
Project: Pavement Evaluation Study
Location: Kenwood Rd. & Shawnee Run Rd.Madeira, OH

Figure 1

Hamilton County

2001 CAGIS

N
W E
S

1" = 500'

Parcline.shp
Streets.shp
Interstate Highway
US & State Rts
Arterial Roads
Collector Roads
Local Streets
Highway Ramps
Primroad.shp
Cityfund.shp

LEGEND

K- • TEST BORING LOCATION IN
P- EXISTING ROAD PAVEMENT

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GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS

TEST BORING LOCATION PLAN

CLIENT: CITY OF MADEIRA
KENWOOD AND SHAWNEE RUN ROAD
PAVEMENT EVALUATION
MADEIRA, OHIO

W.O. 01933.016

SEPT. 2007	1" = 500'	FIGURE 2

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LOG OF TEST BORING

Client: City of Madeira
Project: Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation
Boring Location: As Shown On Test Boring Location Plan
Elevation Ref.

Boring No.: K-1
Date Started: 8/31/2007
Date Completed: 8/31/2007
Work Order No.: 01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.8	0.8 ASPHALT PAVEMENT											
1.5	0.7 Brown medium to coarse sand, little gravel (GRANULAR BASE), wet-loose											
	Gray clay, little sand, trace gravel (FILL), moist to very moist-stiff	1	ST	1.5-3.5	PUSHED	45		26				
	4.0	2	SS	3.5-5.0	3-2-2 (4)	80		28				2.0
▽ 5.5		3	SS	5.0-5.5	1	100						
6.5	1.0 Brown and gray CLAY, trace to little sand (GLACIAL TILL), moist-stiff to soft	3A	SS	5.5-6.5	1-1			25				2.0
	BORING COMPLETED @ 6.5'											

General Notes

Driller	B. Wallace
Rig No.	B-57
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 97.7 pcf

Water Level Observations

Immediate	5.5	ft. ▽
At Completion	NW	ft.
After	0 Hrs.	BF ft.
Water used in drilling	0	ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

Kenwood Rd at

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

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LOG OF TEST BORING

Client	City of Madeira	Boring No.	K-2
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	8/31/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	8/31/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.4	0.4 ASPHALT PAVEMENT											
1.0	0.6 (2 1/2" overlay + 2 1/2" asphalt surface with											
1.2	0.2 tack coat in between layers)											
3.5	2.3 CONCRETE PAVEMENT (with 1/4" bar reinforcing mesh)	1	ST	1.5-3.5	PUSHED	100		29				4.0
5.0	GRANULAR BASE 1.5 Brown clay / lean clay, little silt, trace sand (FILL), moist-very stiff	2	SS	3.5-5.0	9-10-12 (22)	67		18				4.0
6.5	1.5 Brown CLAY / LEAN CLAY, little silt, trace sand and limestone fragments, moist-very stiff	3	SS	5.0-6.5	3-3-4 (7)			21				4.0
	Brown trace gray CLAY/LEAN CLAY, trace sand, moist-very stiff											
	BORING COMPLETED @ 6.5'											

Kenwood Road

General Notes

Driller	B. Wallace
Rig No.	B-57
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 95.7 pcf

Water Level Observations

Immediate	NW		ft.
At Completion	NW		ft.
After	0	Hrs. BF	ft.
Water used in drilling	0		ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

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LOG OF TEST BORING

Client	City of Madeira	Boring No.	K-3
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	8/31/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	8/31/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.2	0.2 ASPHALT PAVEMENT											
0.8	0.6 CONCRETE PAVEMENT (with 1/4" bar reinforcing mesh)											
3.5	2.7 Dark brown clay, little sand and gravel (FILL), moist-stiff	1	ST	1.5-3.5	PUSHED	65		18				1.5
▽ 5.0	1.5 Brown and gray CLAY / FAT CLAY (RESIDUUM), very moist-stiff to very stiff	2	SS	3.5-5.0	25-16-10 (26)	80		24				2.0
5.7	0.7 Brown CLAY / FAT CLAY, little limestone fragments (RESIDUUM), wet-very soft	3	SS	5.0-5.7	9-50/0.2	100		21				
	BORING COMPLETED @ 5.7'											

Kenwood Road

General Notes

Driller	B. Wallace
Rig No.	B-57
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 104.6 pcf

Water Level Observations

Immediate	5	ft. ▽
At Completion	NW	ft.
After	0 Hrs.	BF ft.
Water used in drilling	0	ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

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LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-1
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	9/4/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	9/4/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.8	0.8 ASPHALT PAVEMENT											
1.4	0.6 (1 1/4" overlay + 2 1/2" asphalt surface + 5 1/2" asphalt base)											
	2.0 CRUSHED CONCRETE	1	ST	1.4-3.4	PUSHED	85		24				2
3.4	Brown and gray CLAY, trace sand and gravel, moist-stiff											
	3.0 Brown CLAYEY SAND, little cobbles, trace gravel, wet-medium dense	2	SS	3.4-4.9	6-9-9 (18)	0						
6.4		3	SS	4.9-6.4	5-8-10 (18)	13		24				
	BORING COMPLETED @ 6.4'											

General Notes

Driller	S. Wanstrath
Rig No.	42
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 99.8 pcf
*Water used for pavement coring

Water Level Observations

Immediate	NW			ft.
At Completion	NW			ft.
After	0	Hrs.	BF	ft.
Water used in drilling	0			ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/19/07

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LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-2
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	8/30/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	8/30/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.5	0.5 ASPHALT PAVEMENT											
1.4	0.9 (1" overlay + 2 1/2" asphalt surface + 2 1/2" asphalt base)											
	2.0 BROKEN CONCRETE	1	ST	1.4-3.4	PUSHED	100		24	26	5		0.5
3.4	Dark gray silty clay, little sand (FILL), moist to wet-soft											
4.9	1.5 Brown CLAY / LEAN CLAY, trace sand (GLACIAL TILL), very moist-medium stiff	2	SS	3.4-4.9	3-4-4 (8)	100		24				1
6.4	1.5 Brown LEAN CLAY, little silt and sand (GLACIAL TILL), moist-very stiff	3	SS	4.9-6.4	8-11-11 (22)	100		27				4
	BORING COMPLETED @ 6.4'											

General Notes

Driller	S. Wanstrath
Rig No.	42
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 120.5 pcf

Water Level Observations

Immediate	NW	ft.
At Completion	NW	ft.
After	0 Hrs.	BF ft.
Water used in drilling	0	ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

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LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-3
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	8/30/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	8/30/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness		SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0													
1.4	ASPHALT PAVEMENT (2 1/2" overlay + 2 1/2" asphalt surface + 2 1/2" intermediate course + 9 1/2" asphalt base layer)	1.4											
2.5	BROKEN CONCRETE	1.1											
4.5	Dark brown and gray lean clay, trace sand and gravel (FILL), moist-soft	2.0	1	ST	2.5-4.5	PUSHED	0						
	Brown and gray CLAY/FAT CLAY, moist-stiff to very stiff	3.0	2	SS	4.5-6.0	4-4-6 (10)	100		30				2
7.5			3	SS	6.0-7.5	6-8-10 (18)	100		24				3
	BORING COMPLETED @ 7.5'												

General Notes

Driller	S. Wanstrath
Rig No.	42
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

*Water used for pavement coring

Water Level Observations

Immediate	NW			ft.
At Completion	NW			ft.
After	0	Hrs.	BF	ft.
Water used in drilling	0			ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

H.C. NUTTING COMPANY
CORPORATE CENTER - 611 LUNKEN PARK DRIVE
CINCINNATI, OH 45226 (513) 321-5816
FAX (513) 321-0294
EMPLOYEE OWNED
GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921

APPALACHIAN REGION
912 MORRIS STREET
CHARLESTON, WV 25301
(304) 344-0821
FAX (304) 342-4711

CENTRAL OHIO REGION
790 MORRISON ROAD
COLUMBUS, OH 43230
(614) 863-3113
FAX (614) 863-0475

INDIANA REGION
348 WALNUT STREET, STE 8
LAWRENCEBURG, IN 47025
(812) 539-4300
FAX (812) 538-4301

BLUEGRASS REGION
470-B CONWAY CT., STE B-8
LEXINGTON, KY 40511
(859) 455-8530
FAX (859) 455-8630

LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-4
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	8/30/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	8/30/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.8	0.8 ASPHALT											
1.4	0.6 GRANULAR BASE											
	Brown and gray clay / fat clay, trace limestone fragments (FILL), moist-stiff	1	ST	1.5-3.5	PUSHED	25		19				
3.6												
5.0		2	SS	3.5-5.0	4-9-10 (19)	20		30				2.0
6.5	1.5 Brown trace gray CLAY, some silt, little limestone fragments (RESIDUUM), moist-very stiff	3	SS	5.0-6.5	8-11-31 (42)	87		18				3.5
	BORING COMPLETED @ 6.5'											

General Notes

Driller	B. Wallace
Rig No.	B-57
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 103.8 pcf

Water Level Observations

Immediate	NW			ft.
At Completion	NW			ft.
After	0	Hrs.	BF	ft.
Water used in drilling	0			ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

H.C. NUTTING COMPANY

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EMPLOYEE OWNED

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921

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LEXINGTON, KY 40511
(859) 455-8530
FAX (859) 455-8630

LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-5
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	9/4/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	9/4/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0												
0.9	0.9 ASPHALT PAVEMENT											
1.3	0.4 BROKEN CONCRETE											
3.3	2.0 Brown trace gray LEAN CLAY, moist to very moist-medium stiff to very soft	1	ST	1.3-3.3	PUSHED	100		25	32	16		0.25
	3.0 Brown CLAY / FAT CLAY, trace sand, moist-very stiff	2	SS	3.3-4.8	4-7-10 (17)	100		26				3.5
6.3		3	SS	4.8-6.3	8-12-14 (26)	33		26				2.5
	BORING COMPLETED @ 6.3'											

General Notes

Driller	S. Wanstrath
Rig No.	42
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 101.7 pcf

Water Level Observations

Immediate	NW		ft.
At Completion	NW		ft.
After	0	Hrs. BF	ft.
Water used in drilling	0		ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/19/07

H.C. NUTTING COMPANY

CORPORATE CENTER - 611 LUNKEN PARK DRIVE
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EMPLOYEE OWNED

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921

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LEXINGTON, KY 40511
(859) 455-8530
FAX (859) 455-8630

LOG OF TEST BORING

Client: City of Madeira
Project: Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation
Boring Location: As Shown On Test Boring Location Plan
Elevation Ref.

Boring No.: P-6
Date Started: 9/4/2007
Date Completed: 9/4/2007
Work Order No.: 01933.016

DEPTH ft.			DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness	SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0														
0.7		0.7	ASPHALT PAVEMENT											
1.4		0.7	(1 1/4" overlay + 3 3/4" asphalt surface + 3 1/2" asphalt base)											
2.3		0.9	CONCRETE PAVEMENT	1	ST	1.4-1.8	PUSHED	0						
3.3		1.0	Brown gravel and cobbles, trace sand (GRANULAR BASE), wet-loose to medium dense	2	SS	1.8-2.3	12	100		15				
				2A	SS	2.3-3.3	4-3	50		30				1.0
4.8		1.5		3	SS	3.3-4.8	4-6-8 (14)	27		25				
6.3		1.5	Brown and gray clay/fat clay, trace sand and gravel (FILL), moist-medium stiff	4	SS	4.8-6.3	35-15-44 (59)	87		20				0.5
			Brown and gray clayey sand and gravel (FILL), very moist-medium dense											
			Brown trace gray clay, trace to little limestone fragments and shale fragments (POSSIBLE FILL), very moist-soft											
			BORING COMPLETED @ 6.3'											

General Notes

Driller: S. Wanstrath
Rig No.: 42
Rig Type: Truck
Method: SS/ST
Inspector:

Remarks

Water Level Observations

Immediate: NW ft.
At Completion: NW ft.
After: 0 Hrs. BF ft.
Water used in drilling: 0 ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

H.C. NUTTING COMPANY
CORPORATE CENTER - 611 LUNKEN PARK DRIVE
CINCINNATI, OH 45226 (513) 321-5816
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BLUEGRASS REGION
470-B CONWAY CT., STE B-B
LEXINGTON, KY 40511
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LOG OF TEST BORING

Client: City of Madeira
Project: Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation
Boring Location: As Shown On Test Boring Location Plan
Elevation Ref.

Boring No.: P-7
Date Started: 9/4/2007
Date Completed: 9/4/2007
Work Order No.: 01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness		SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0													
0.6	0.6 ASPHALT PAVEMENT (3 1/2" overlay + 3 1/2" asphalt surface)												
2.1	1.5 Brown fine to medium sand, little gravel and cobbles (GRANULAR BASE)												
	3.5 Brown LEAN CLAY, some silt, little sand (GLACIAL TILL), moist-very stiff		1	ST	2.1-4.1	PUSHED	30		24				
5.6			2	SS	4.1-5.6	6-8-12 (20)	100		17				4.0
7.1	1.5 Brown CLAY, little sand, trace gravel (GLACIAL TILL), moist-very stiff		3	SS	5.6-7.1	9-11-14 (25)	87		26				4.0
	BORING COMPLETED @ 7.1'												

General Notes

Driller: S. Wanstrath
Rig No.: 42
Rig Type: Truck
Method: SS/ST
Inspector:

Remarks

1/ST - Dry Unit Weight = 101.3 pcf

Water Level Observations

Immediate	NW	ft.
At Completion	NW	ft.
After	0 Hrs.	BF ft.
Water used in drilling	0	ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/19/07

H.C. NUTTING COMPANY

CORPORATE CENTER - 611 LUNKEN PARK DRIVE
CINCINNATI, OH 45226 (513) 321-5816
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EMPLOYEE OWNED

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921

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BLUEGRASS REGION
470-B CONWAY CT., STE B-1
LEXINGTON, KY 40511
(859) 455-8530
FAX (859) 455-8630

LOG OF TEST BORING

Client	City of Madeira	Boring No.	P-8
Project	Kenwood Rd. and Shawnee Run Rd. Pavement Evaluation	Date Started	9/4/2007
Boring Location	As Shown On Test Boring Location Plan	Date Completed	9/4/2007
Elevation Ref.		Work Order No.	01933.016

DEPTH ft.	DESCRIPTION OF MATERIALS color, material description, moisture, stiffness/density/hardness		SAMPLE NO.	TYPE	DEPTH ft.	BLOWS/6" (N Value)	REC. %	RQD %	W %	LL %	PI %	Qu tsf	PPR tsf
0.0													
0.6		0.6 ASPHALT PAVEMENT											
1.4		0.8 GRANULAR BASE											
3.5		2.1 Dark gray clay with organics, wood fragments and root matter (FILL), moist-soft	1	ST	1.5-3.5	PUSHED	60		34				
5.0		1.5 Brown CLAY/FAT CLAY, trace sand (RESIDUUM), moist-very stiff	2	SS	3.5-5.0	5-5-6 (11)	67		22				4.0
5.8		0.8 Brown and gray CLAY/FAT CLAY, little limestone fragments (RESIDUUM), moist-very stiff	3	SS	5.0-5.8	17-50/0.3	100		21				4.0
		BORING COMPLETED @ 5.8'											

General Notes

Driller	B. Wallace
Rig No.	B-57
Rig Type	Truck
Method	SS/ST
Inspector	

Remarks

1/ST - Dry Unit Weight = 69.1 pcf

Water Level Observations

Immediate	NW		ft.
At Completion	NW		ft.
After	0	Hrs. BF	ft.
Water used in drilling	0		ft.

BF = BACKFILLED NW = NO WATER
(Measured from ground surface)

TEST BORING BORING LOGS.GPJ HC NUTTING.GDT 9/18/07

H.C. Nutting Company
611 Lunken Park Dr.
Cincinnati, Ohio 45226

City of Madeira, Ohio
Kenwood & Shawnee Run Road
Madeira, Ohio
HCN W.O. #01933.016

TABLE I: CLASSIFICATION TEST DATA

Boring No.	Sample No.	Depth (ft.)	Moisture Content %	Atterberg Limits			Maximum Dry Density (pcf)	Optimum Moisture Content (%)
				Liquid Limit %	Plastic Limit %	Plasticity Index		
K-1	2	3.5-5	27.7					
	3	5-6.5	25.1					
K-2	2	3.5-5	18.4					
	3	5-6.5	21.1					
K-3	2	3.5-5	23.5					
	3	5-6.5	21.2					
P-1	3	4.9-6.4	23.7					
P-2	ST-1	1.4-3.4	24.1	26	21	5		
	2	3.4-4.9	24.2					
	3	4.9-6.4	27.3					
P-3	2	4.5-6	30.4					
	3	6-7.5	23.6					
P-4	2	3.5-5	29.9					
	3	5-6.5	18.0					
P-5	ST-1	1.3-3.3	24.8	32	16	16		
	2	3.3-4.8	26.2					
	3	4.8-6.3	25.9					
P-6	2	1.8-2.3	14.5					
	2A	1.8-2.3	29.6					
	3	3.3-4.8	24.7					
	4	4.8-6.3	25.9					

H.C. Nutting Company
611 Lunken Park Dr.
Cincinnati, Ohio 45226

City of Madeira, Ohio
Kenwood & Shawnee Run Road
Madeira, Ohio
HCN W.O. #01933.016

TABLE I: CLASSIFICATION TEST DATA

Boring No.	Sample No.	Depth (ft.)	Moisture Content %	Atterberg Limits			Maximum Dry Density (pcf)	Optimum Moisture Content (%)
				Liquid Limit %	Plastic Limit %	Plasticity Index		
P-7	2	4.1-5.6	16.8					
	3	5.6-7.1	26.3					
P-8	2	3.5-5	21.8					
	3	5-6.5	20.5					
P-1,P-2, P-3	BS-2 (Bag)	1.5-5	---	33	17	16	108.6	16.7
P-5,P-6, P-7	BS-3 (Bag)	1.5-5	---	39	18	21	107.2	18.6
K-1,K-2, K-3	BS-1 (Bag)	1.5-5	---	37	18	19	109.5	16.9

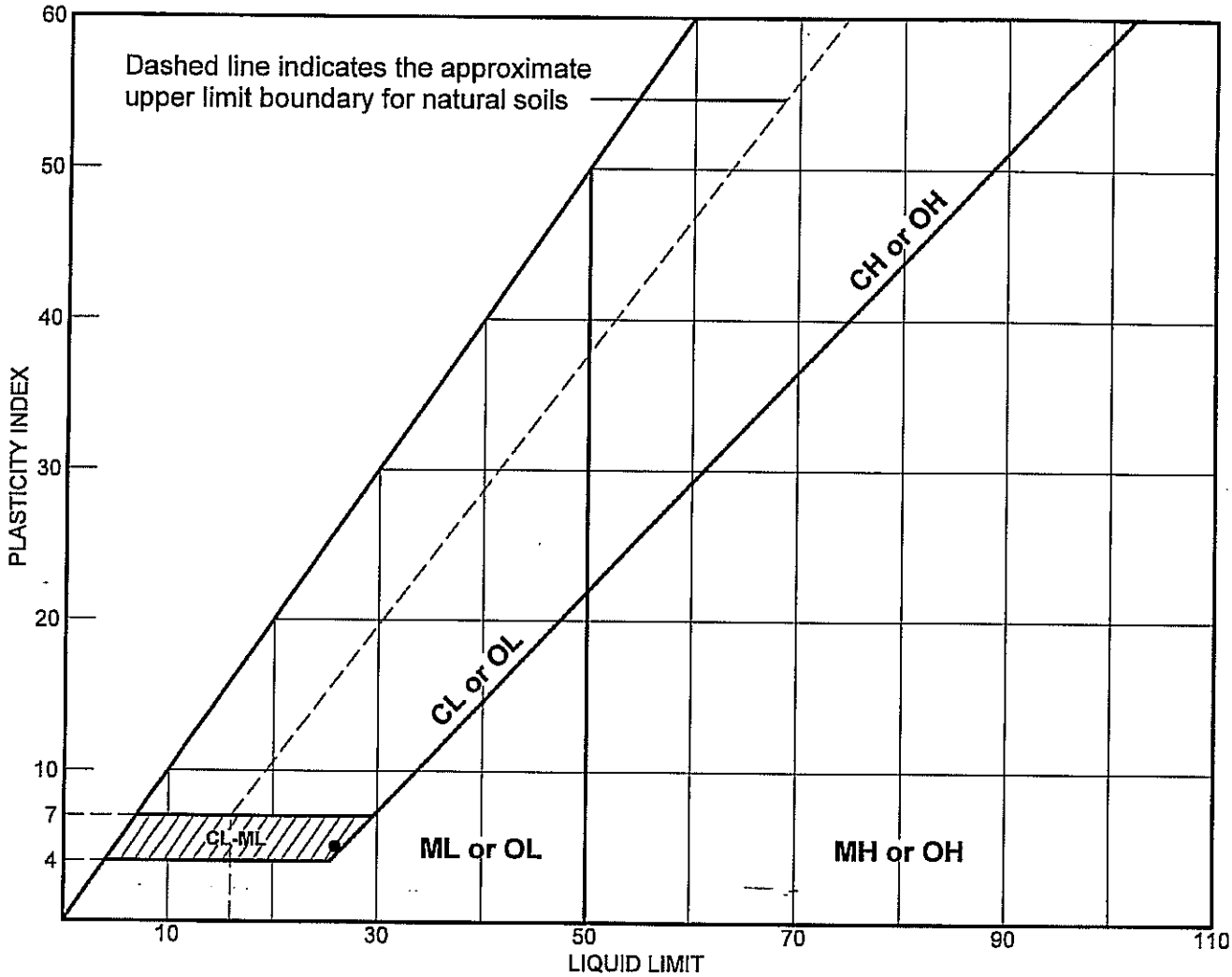
H.C. Nutting Company
611 Lunken Park Dr.
Cincinnati, Ohio 45226

City of Madeira, Ohio
Kenwood & Shawnee Run Road
Pavement Evaluation
Madeira, Ohio
HCN W.O. #01933.016

TABLE II: TABULATION OF UNDISTURBED DATA (UNIT WEIGHT)

Boring No.	Sample No.	Depth (ft.)	Material Description	Dry Density (pcf)	Water Content (%)
K-1	ST-1	1.5-3.5	Lean clay	97.7	25.8
K-2	ST-1	1.5-3.5	Clay	95.7	28.5
K-3	ST-1	1.5-3.5	Lean clay	104.6	18.0
P-1	ST-1	1.4-3.4	Lean clay	99.8	23.9
P-2	ST-1	1.4-3.4	Lean clay	120.5	24.1
P-3	ST-1	2.5-4.5	No Recovery	---	---
P-4	ST-1	1.5-3.5	Clay	103.8	18.9
P-5	ST-1	1.3-3.3	Lean clay	101.7	24.8
P-6	ST-1	1.4-1.8	No Recovery	---	---
P-7	ST-1	2.1-4.1	Lean clay	101.3	23.5
P-8	ST-1	1.5-3.5	Clay	69.1	34.1

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	P-2	ST-1	1.4-3.4'		21	26	5	

LIQUID AND PLASTIC LIMITS TEST REPORT

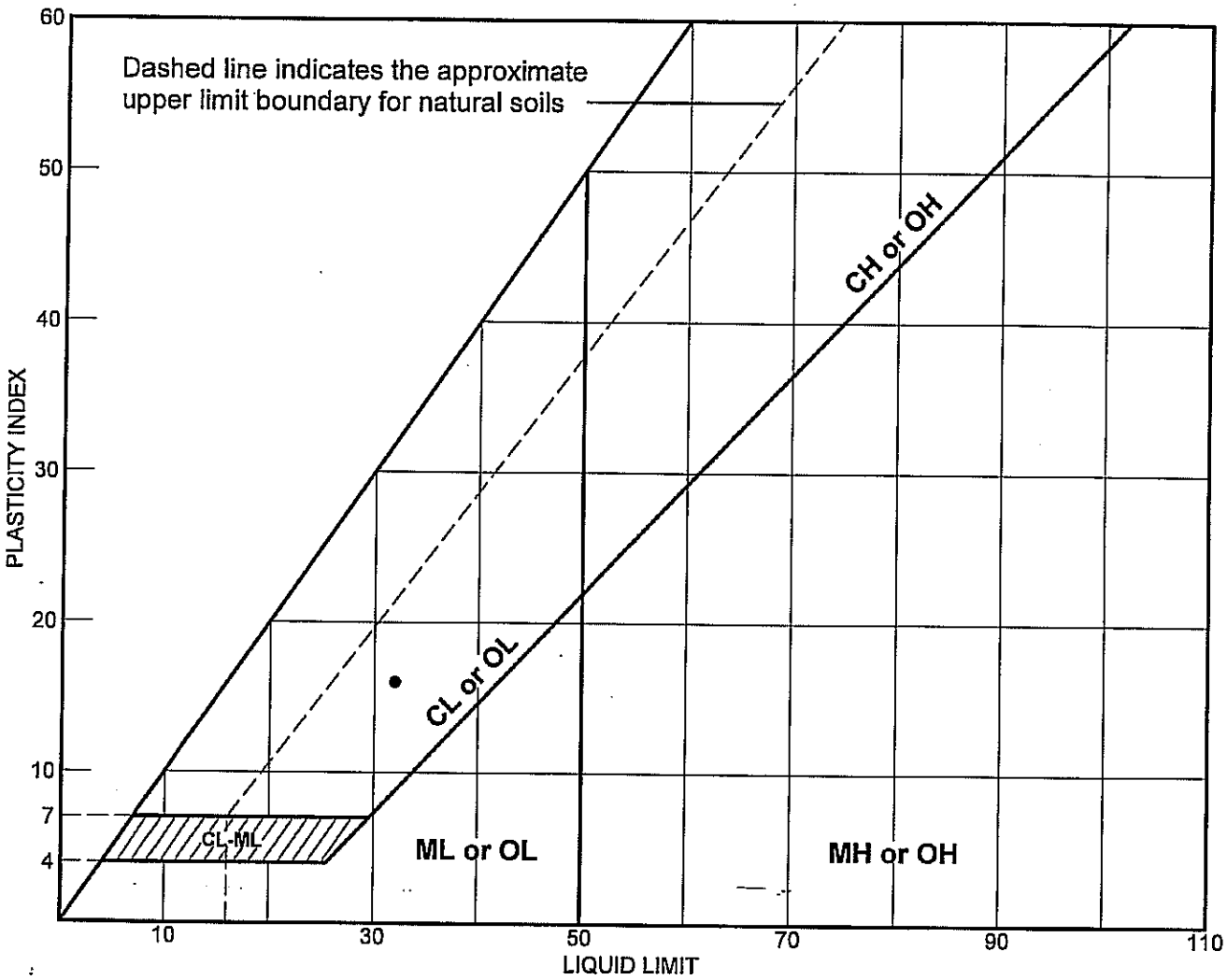
H. C. NUTTING COMPANY

Client: CITY OF MADEIRA, OHIO

Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

Project No.: 01933.016 **Figure** 9803

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	P-5	ST-1	1.3-3.3'		16	32	16	

LIQUID AND PLASTIC LIMITS TEST REPORT

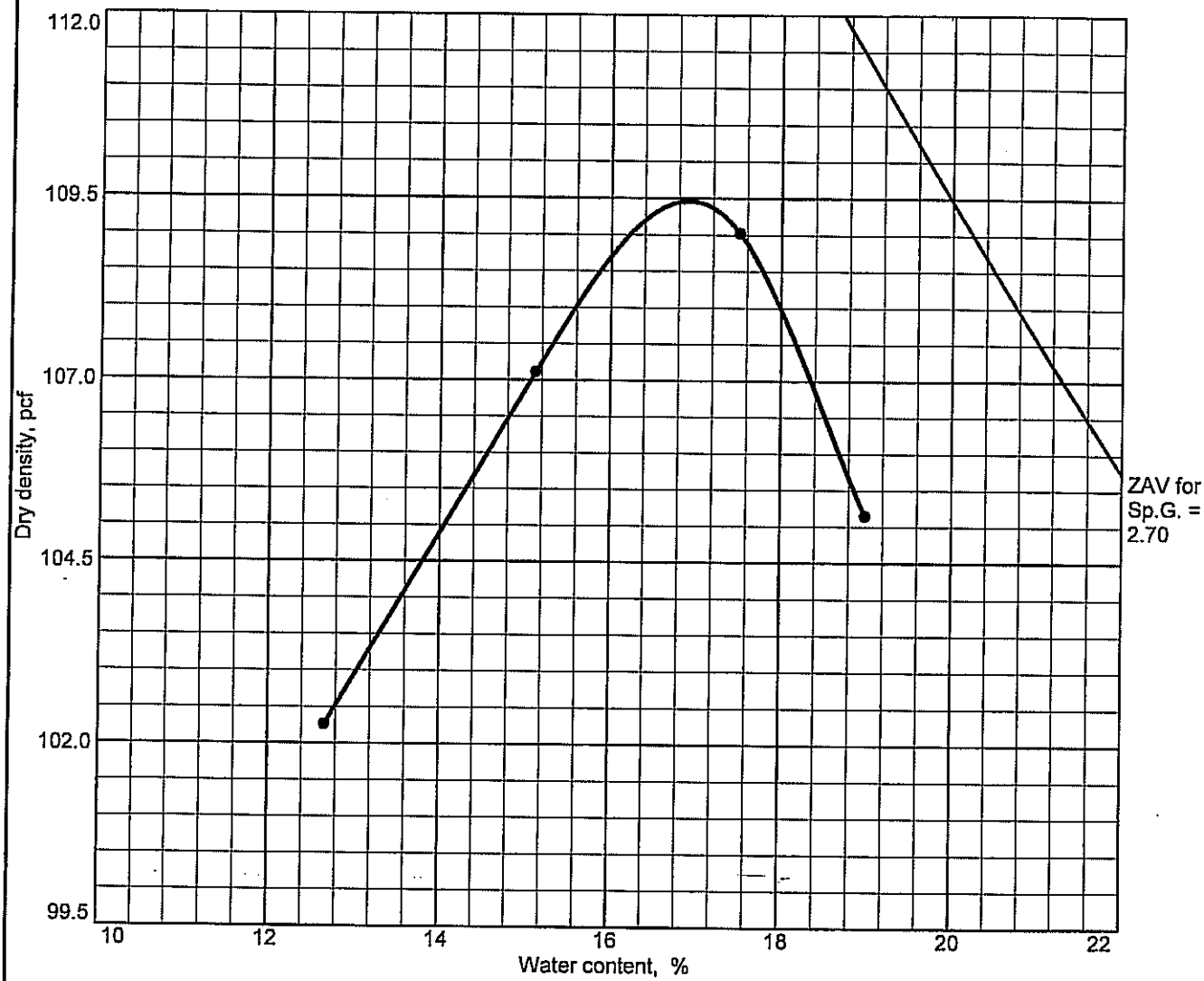
H. C. NUTTING COMPANY

Client: CITY OF MADEIRA, OHIO

Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

Project No.: 01933.016 **Figure** 9809

COMPACTION TEST REPORT



Test specification: ASTM D 698-00 Procedure B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1.5-5'					37	19		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 109.5 pcf Optimum moisture = 16.9 %	BROWN LEAN CLAY

Project No. 01933.016 **Client:** CITY OF MADEIRA, OHIO
Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

● **Source:** K1,K2,K3 **Sample No.:** BS-1 **Elev./Depth:** 1.5-5'

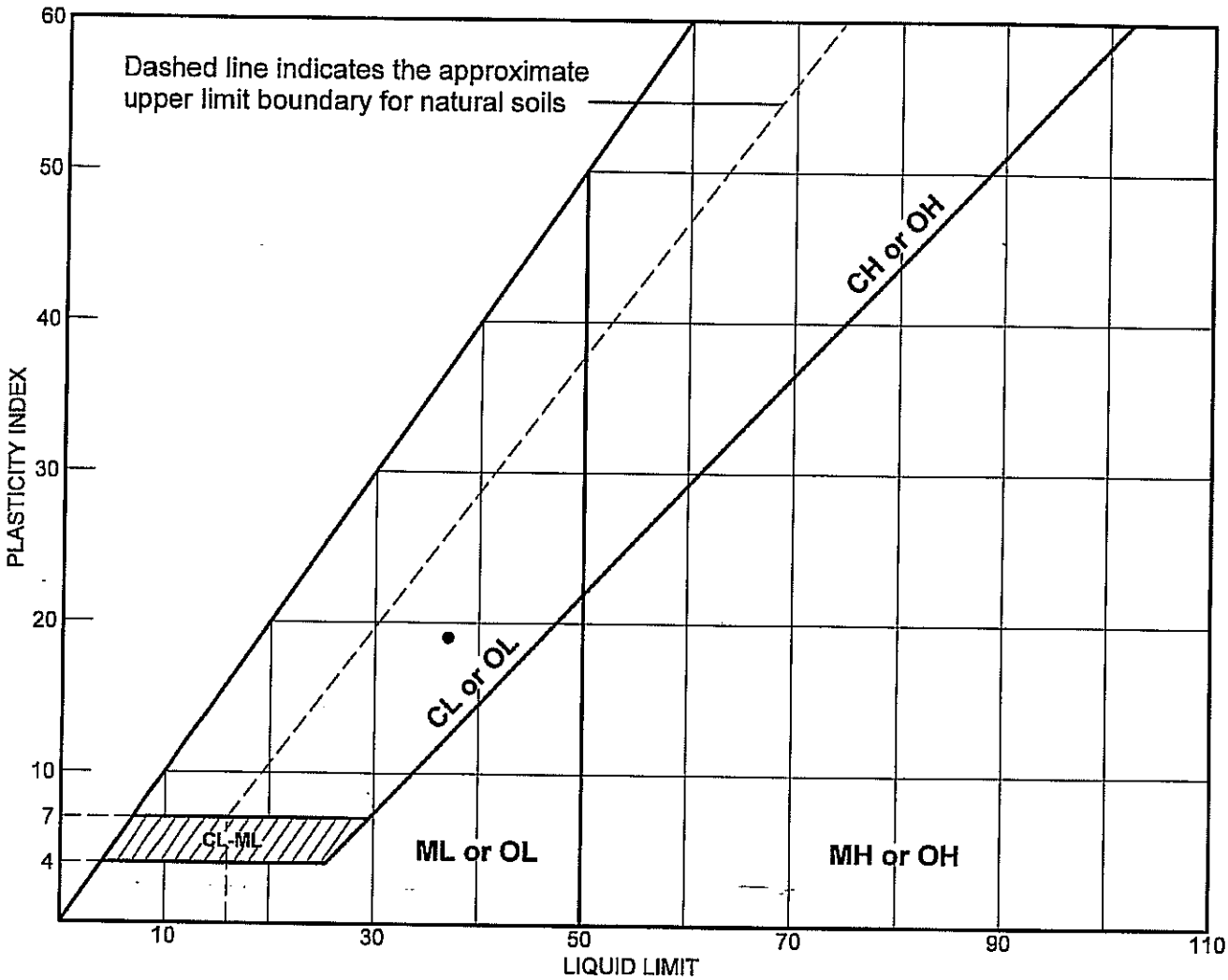
Remarks:
DATE TYPED 9-12-07
TESTED BY EJ

COMPACTION TEST REPORT

H. C. NUTTING COMPANY

Figure 9772

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	K1,K2,K3	BS-1	1.5-5'		18	37	19	

LIQUID AND PLASTIC LIMITS TEST REPORT

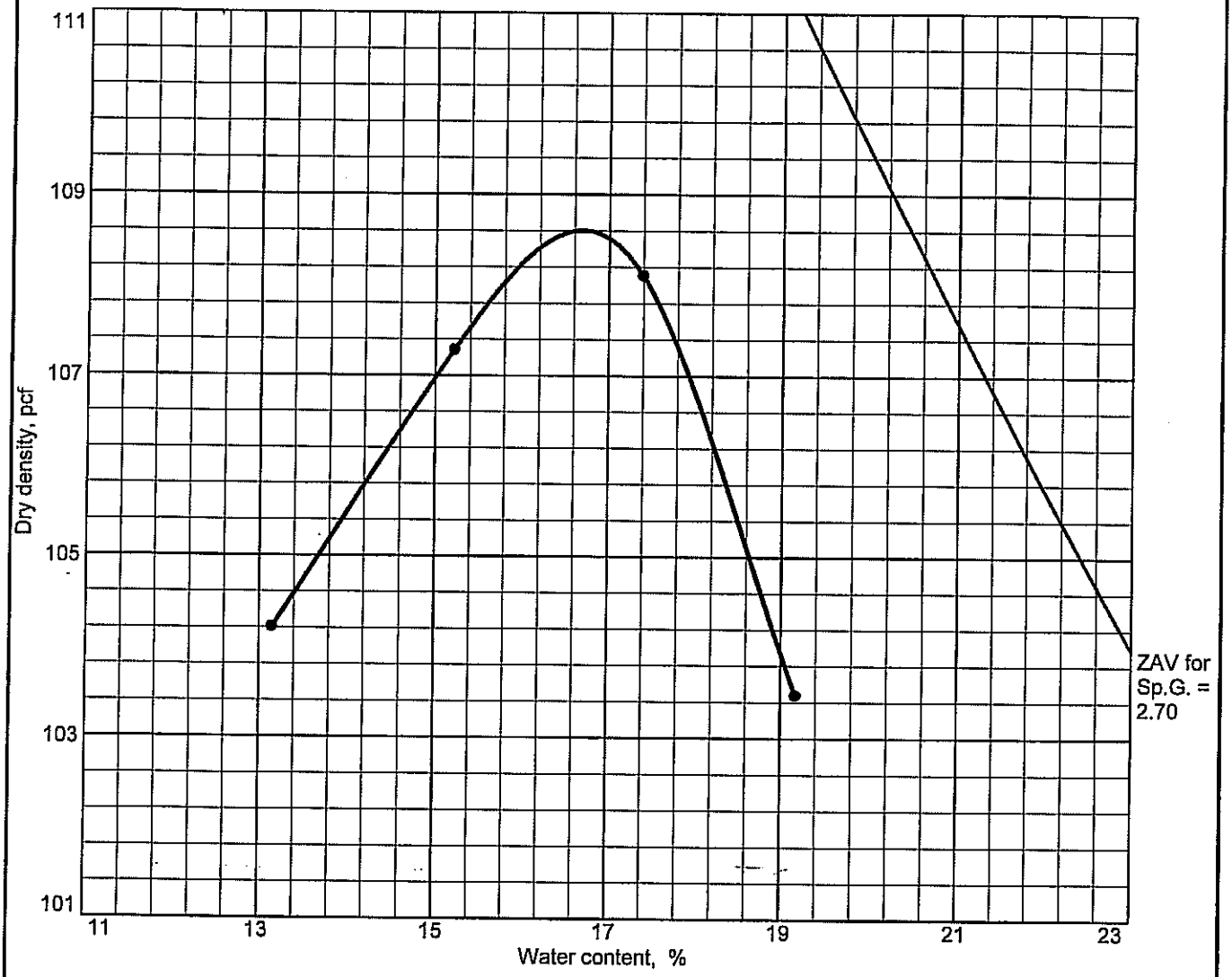
H. C. NUTTING COMPANY

Client: CITY OF MADEIRA, OHIO

Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

Project No.: 01933.016 **Figure** 9772

COMPACTION TEST REPORT



Test specification: ASTM D 698-00 Procedure B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1.5-5'					33	16		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.6 pcf Optimum moisture = 16.7 %	BROWN LEAN CLAY

Project No. 01933.016 **Client:** CITY OF MADEIRA, OHIO
Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

● **Source:** P1,P2,P3 **Sample No.:** BS-2 **Elev./Depth:** 1.5-5'

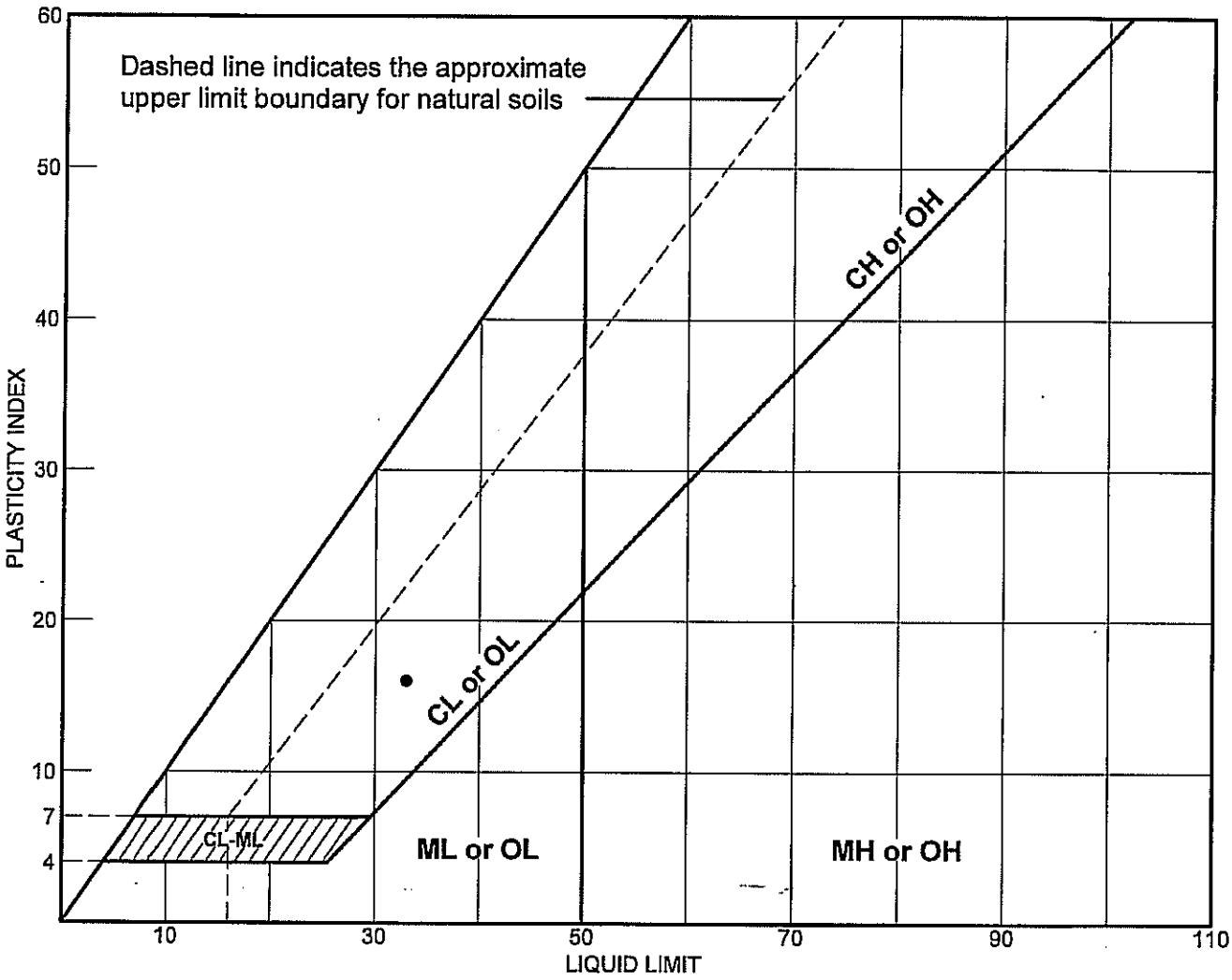
Remarks:
DATE TYPED 9-11-07
TESTED BY EJ

COMPACTION TEST REPORT

H. C. NUTTING COMPANY

Figure 9770

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	P1,P2,P3	BS-2	1.5-5'		17	33	16	

LIQUID AND PLASTIC LIMITS TEST REPORT

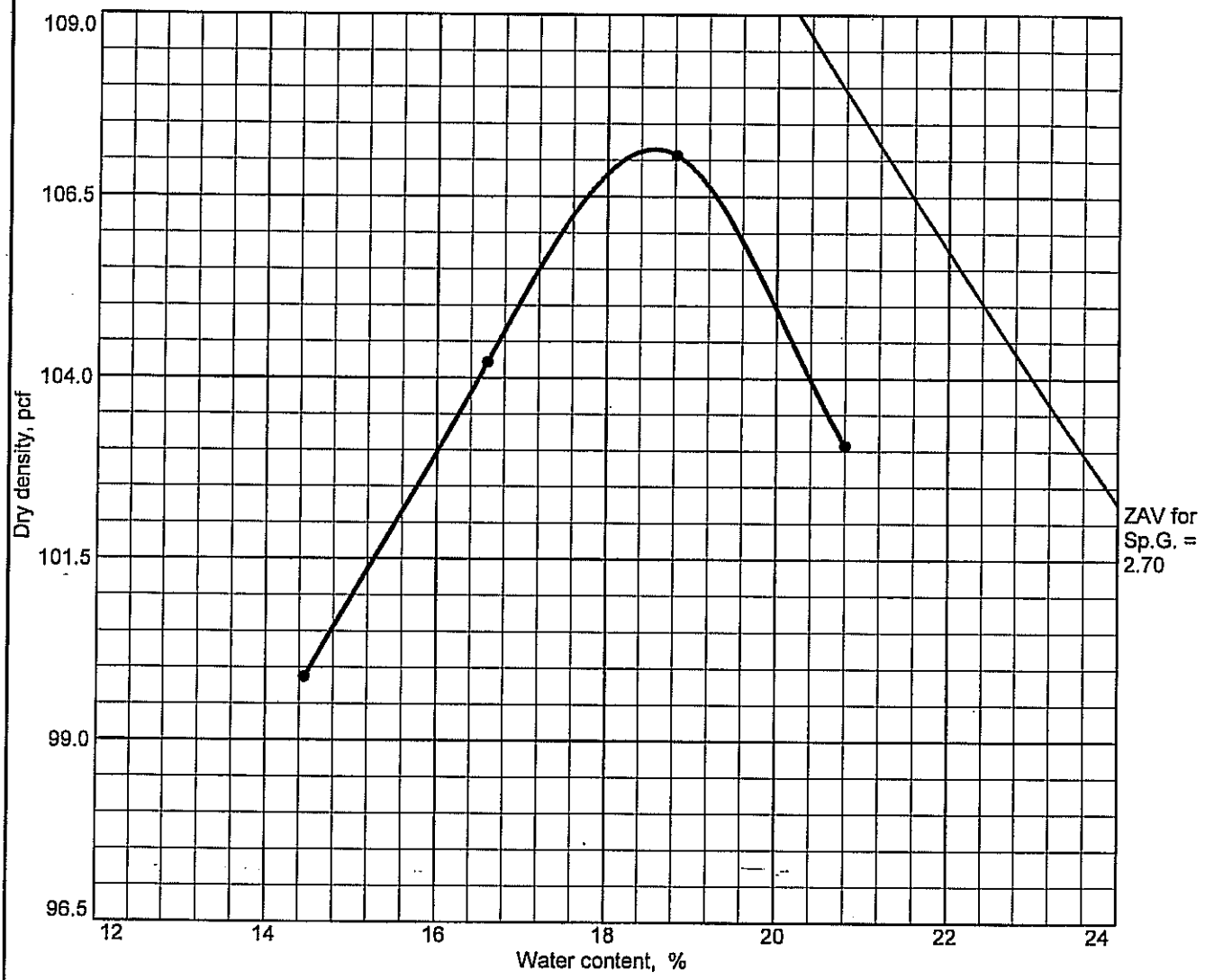
H. C. NUTTING COMPANY

Client: CITY OF MADEIRA, OHIO

Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

Project No.: 01933.016 **Figure** 9770

COMPACTION TEST REPORT



Test specification: ASTM D 698-00 Procedure B Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
1.5-5'					39	21		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 107.2 pcf Optimum moisture = 18.6 %	BROWN LEAN CLAY

Project No. 01933.016 **Client:** CITY OF MADEIRA, OHIO
Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

● **Source:** P5,P6,P7 **Sample No.:** BS-3 **Elev./Depth:** 1.5-5'

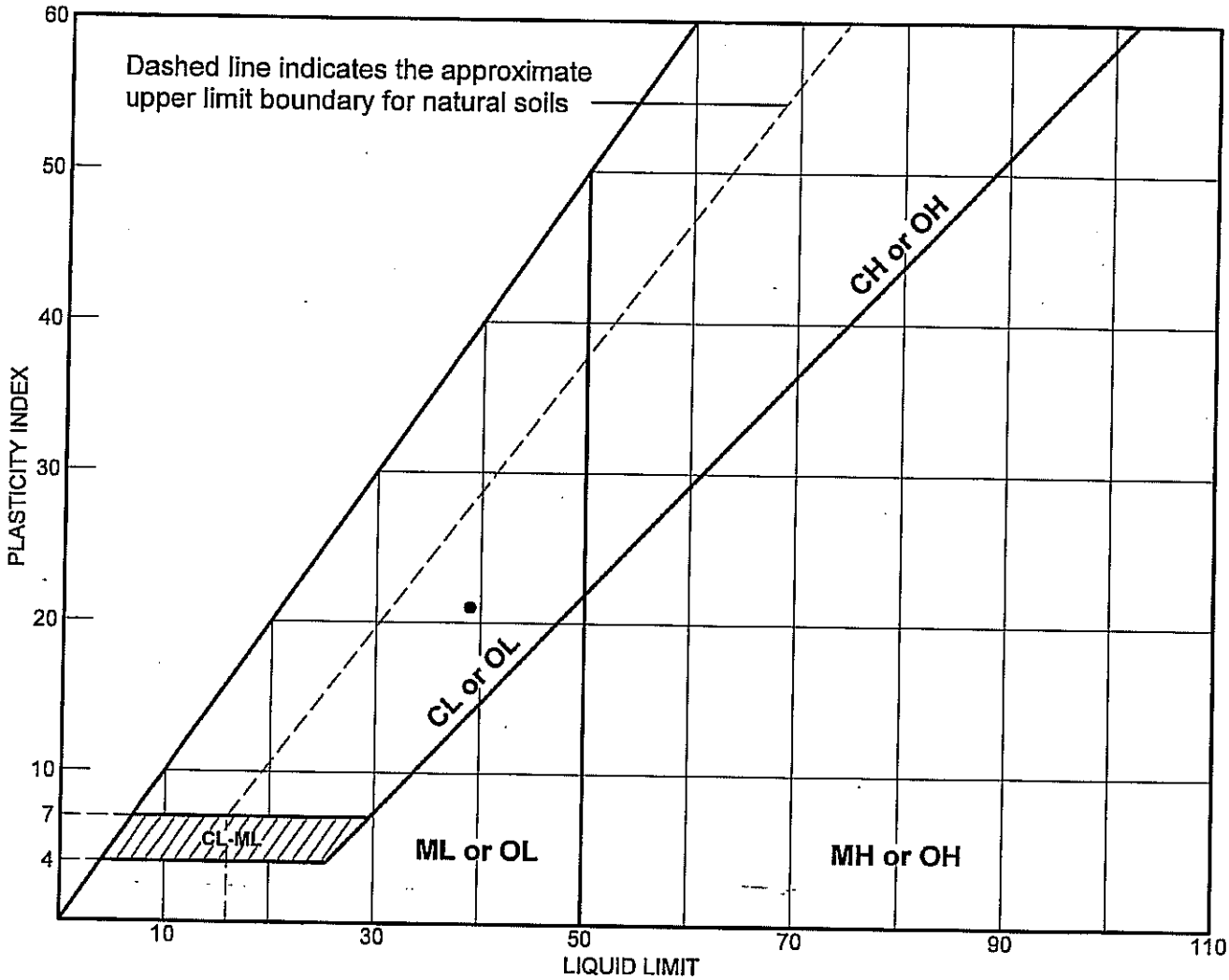
Remarks:
DATE TYPED 9-12-07
TESTED BY EJ

COMPACTION TEST REPORT

H. C. NUTTING COMPANY

Figure 9771

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	P5,P6,P7	BS-3	1.5-5'		18	39	21	

LIQUID AND PLASTIC LIMITS TEST REPORT

H. C. NUTTING COMPANY

Client: CITY OF MADEIRA, OHIO

Project: KENWOOD AND SHAWNEE RUN RD. PAVEMENT EVAL.

Project No.: 01933.016 **Figure** 9771

H. C. NUTTING COMPANY
EMPLOYEE OWNED
GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS
SINCE 1921

CORPORATE CENTER
611 LUNKEN PARK DRIVE
CINCINNATI, OHIO 45226
(513) 321-5816
FAX (513) 321-0294

SAMPLE DISPOSITION

Unless other arrangements are made with H. C. Nutting Company (HCN), all soil and rock core samples collected during the course of this work will be disposed of 30 days after our report or lab test result submittal.

If the client wishes to avoid sample disposal in 30 days, other arrangements can be made, including any of the following:

1. The samples may be picked up by the client's representative from HCN's office, as prescheduled with HCN. The pick up date must precede the 30-day limit described above.

2. The samples can be shipped to the client by HCN. All costs associated with shipping shall be borne by the client.

3. The samples can be stored by HCN at a cost borne by the client. This cost will be based on the type of samples stored (boxes of soil sample jars, rock core boxes, etc.) and the duration of storage. Specific needs for sample storage beyond 30 days shall be detailed in the contract at agreed upon rates.

Requested Alternate Action:

_____Samples to be picked up by Client
(arrangements will be coordinated with Laboratory Manager)

_____Samples to be shipped to:_____
(costs borne by client) _____
_____
_____

_____Samples to be stored by HCN at negotiated rates

Acknowledgment:
Company:_____
Name:_____
Signature:_____
Date:_____

Please return this form to: H.C. Nutting Co. 611 Lunken Park Dr. Cincinnati, OH 45226
Attn: Laboratory Manager
Phone: (513) 321-5816, Fax: (513) 321-0294